CHANGES IN THE CONVERSATIONAL SKILLS OF PRESCHOOL CHILDREN WITH COMPLEX DEVELOPMENTAL DIFFICULTIES

Tze Peng Wong

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The material presented in this thesis is the original work of the candidate except as acknowledged in the text, and has not been previously submitted, either in part or in whole, for a degree at this or any other University.

Tze Peng Wong

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ABSTRACT

Caregiver-child conversation is an important platform for children's development of language and conversational skills and can form the basis for an approach to intervention for children with pragmatic difficulties. While most intervention studies have focused on reporting overall improvements in children's language and conversational skills as a result of changes in caregiver behaviour, there is limited fine-grained understanding of children's ability to achieve conversational topic contingency as a result of specific changes in their caregivers' use of conversational topic turns and/or the facilitative techniques employed by therapists. The studies described in this thesis aim to address this limitation. The following questions are raised: (i) What is the impact of caregiver training intervention programmes on caregivers' conversational topic turns and facilitative techniques? (ii) What is the impact of caregiver training intervention programmes on children's conversational topic turns? and (iii) How do specific facilitative techniques impact children's conversational skills?

The first part of this thesis involves establishing the methodology for data transcription and data coding used in the four studies conducted for this thesis. Conversational recordings were transcribed using the CHAT format and conventions. Then a conversational coding system and a facilitative technique coding system were used to code the communicative acts transcribed. The conversational acts coded were topic change (TC), topic extension (TE), topic maintaining responses (TM), and non-relevant responses (NR). The facilitative techniques coded were imitation, expansion, follow-in questions, and follow-in cloze procedures. Inter-rater reliability levels of the transcription and coding of conversational acts and facilitative techniques were high.

Study 1 (presented in Chapter 3) was designed to investigate changes following an 'It Takes Two to Talk' Hanen programme in the conversations of four caregiver-child dyads where the children had identified language delay. It employed a single subject design and the outcome measures were analysed in three phases: baseline, intervention and follow-up. The outcome measures were the rates of (i) caregivers' conversational topic turns (i.e., TC, TE and TM), (ii) caregivers' facilitative techniques (i.e., imitation, expansion, follow-in questions, and follow-in cloze procedures) and (iii) children's conversational topic turns (i.e., TC, TE and TM). Results showed that all caregivers produced fewer TCs and higher rates of facilitative techniques, while all children produced significantly more TEs following

intervention. Individual caregiver patterns of change appeared to be reflected in their children's conversational skills. This study supports the effectiveness of caregiver group training programmes in improving the quality of caregiver-child conversations and highlighted the importance of investigating individual variations in intervention.

Study 2 (presented in Chapter 4) was designed to investigate the changes in conversational skills of three children with features of autism spectrum disorders (ASD) following the dyads' participation in caregiver-child individual training as part of a multidisciplinary programme for children with ASD. This study employed a case series design and the outcome measures were analysed in two phases (i.e., intervention and follow-up). Similar to Study 1, the outcome measures were rates of the (i) caregivers' conversational topic turns (i.e., TC, TE and TM), (ii) caregivers' facilitative techniques (i.e., imitation, expansion, follow-in questions, and follow-in cloze procedures) and (iii) children's conversational topic turns (i.e., TC, TE and TM). Results of Study 2 showed that one of the three caregivers decreased the rates of TC, and one of them increased the rates of TM following intervention. The caregivers also increased their rates of facilitative techniques (i.e., imitation, expansion and follow-in questions). Concurrently, the children whose caregivers showed positive changes following intervention increased their rates of TCs and TMs. Consistent with the findings of Study 1, high individual variations were observed in the changes exhibited by the caregivers. Study 2 supports the effectiveness of individual training programmes in improving the quality of caregiver-child conversations and emphasizes the importance of investigating individual variations in intervention.

Study 3 (presented in Chapter 5) was designed to investigate the qualitative changes made by a child from each of the first two studies. The two children presented with different language levels and aetiologies but both were receiving individualised programmes designed to enhance their conversational abilities. Taking a functional approach to communication development, Study 3 examined how each child (i) collaborated on an activity; (ii) expanded an activity; and (iii) returned to a previous activity or proposed a new activity, through conversational topic turns. Results suggest that the children learnt to collaborate on and expand activities through their caregivers' repeated use of contingent topic turns (i.e., TM and TE) and facilitative techniques (i.e., expansion, follow-in questions and follow-in cloze procedures). However, they tended to return to a previous activity or propose a new activity when they did not attend to the preceding act or topic, seemed to not comprehend or were not interested in the preceding act or topic, or when their caregivers failed to attend to their

preceding act or topic. These findings highlights that while caregivers' topic turns that are contingent and facilitative help children to advance their activities, caregivers' topic turns that are non-contingent have the potential to cause the children to end the preceding activity and switch to another activity.

Study 4 was designed to compare the effectiveness of expansion, as a technique for facilitating children's conversational topic turns, with expansion combined with other techniques when implemented by speech and language therapists (SLTs). Using a repeated measures design, this study aimed to compare the effects of expansion alone (EA); expansion combined with wh-questions (EQ); and expansion followed by a cloze procedure (EC) on the conversational skills of eight preschool children with conversational difficulties in conversation with their regular speech-language therapists (SLTs). Results showed that while there were no significant differences in child verbal topic maintaining responses across all techniques, EA elicited a significantly higher number of TEs, more non-verbal TMs and fewer NRs from the children, than either EQ or EC. The positive effects of each technique on the pragmatic appropriateness in conversations suggest that they could be used strategically in language intervention to enhance therapeutic effect.

This thesis suggests that caregiver training programmes that focus on following the child's lead and support caregivers and therapists to use contingent topic turns and facilitative techniques have positive outcomes for children's conversational development. It also suggested that caregivers' and therapists' facilitative strategies that do not obligate responses from the child (i.e., expansion) have better potentials to help the child to expand the scope of conversations than strategies that obligate a response from the child (i.e., wh-questions and cloze procedures). Finally this thesis suggests that family-focussed intervention that follows the child's lead appears likely to improve the conversational skills of children with a range of diagnoses by helping to address the common underlying features of conversational difficulties.

PUBLICATIONS ARISING FROM THIS THESIS

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LIST OF ABBREVIATIONS

SLT	Speech-language therapist
TC	Topic change
TE	Topic extension
TM	Topic maintaining response
NR	Non-relevant response
ITTT	It Takes Two to Talk (Hanen Programme for Parents)
RC	Relating and Communicating
EA	Expansion only
EQ	Expansion combined with follow-in question
EC	Expansion combined with cloze procedures

CHAPTER 1

LITERATURE REVIEW

1.1 Introduction

Conversation is a spontaneous dialogue between two or more people (H. H. Clark, 1992) that involves the use of multiple utterances that are communicative and contingent with each other (Leinonen, Letts, & Smith, 2000; Lucariello, Kyratzis, & Engel, 1986). It comprises accompanying interpersonal behaviours such as facial expressions and other nonverbal behaviours (McTear, 1985). In conversations, information is processed by both speaker and listener (Sperber & Wilson, 1995). The speaker transmits information, propositions, thoughts, ideas, beliefs, attitudes, and emotions to the listener, and the listener infers meaning from what is said in the conversational context and on the basis of information they already possess (Levy & Nelson, 1994; Sperber & Wilson, 1995).

The development of children's conversational skills begins with early caregiver-child interactions (Bruner, 1983). Through caregivers' use of contingent turns and facilitative techniques, children learn to respond with turns that are also contingent, resulting in a coherent conversation that flows through a series of topics that are related to each other (P. Dunham & Dunham, 1996; Ninio & Snow, 1996; Rocissano & Yatchmink, 1984). Not only does conversational contingency make for a communicative exchange but it also creates a platform for children to further develop language skills (Givón, 2003; Gogate & Hollich, 2010; L. B. Leonard, 2011; K. Nelson, 1986; Snow, 1999; Tomasello, 2000), as well as cognitive and social emotional skills (Greenspan & Shanker, 2007; Ornstein, Haden, & Hedrick, 2004; Ratner, 1984; Thompson, 2006). These skills are inter-dependent and development in each area is essential to support ongoing development in the others. Given the role of conversational contingency in overall language, cognitive, and social development, it is important that children's conversations demonstrate good contingency. In particular, it is important to understand what factors will enhance children's ability to participate effectively in conversation through contingent turns.

The caregiver has been identified as a major influence in facilitating language development, including conversational contingency (Baldwin & Meyer, 2008; Brady, Warren, & Sterling, 2009; Saxton, 2009). In the context of caregiver-child conversations, caregivers constantly modify their conversational input to match their children's new language milestones (Bohannon & Bonvillian, 2009). This dynamic process requires continuous fine-tuning of the caregiver's language input to the child's ongoing language maturation (Clarke-Stewart & Hevey, 1981; Greenspan & Shanker, 2007; Harrist & Waugh, 2002; Rocissano & Yatchmink, 1984; Saxon, Colombo, Robinson, & Frick, 2000; Saxton, 2009). So, as children develop more sophisticated language, the caregivers' input can become more sophisticated both linguistically and conceptually. In early interactions however, the caregiver generally aims to make the input as simple and understandable for the child as possible and it is argued that caregivers' input that follows the child's lead lightens the cognitive burden of children's language processing (Baldwin & Meyer, 2008; Bohannon & Bonvillian, 2009; Gogate & Hollich, 2010; McCarthren, Yoder, & Warren, 1995; K. E. Nelson, 1989).

The dynamics of caregiver-child conversations can be disrupted by children's developmental difficulties (Girolametto & Tannock, 1994; Landry, Smith, & Swank, 2002; Vigil, Hodges, & Klee, 2005). While conversational difficulties have been reported in distinctive clusters according to specific clinical aetiologies such as autism spectrum disorders (ASD), they are not limited to these disorders and are prevalent across a range of disorders with the impact on caregiver-child interactions often being the same regardless of the aetiology (Mahoney & NevilleSmith, 1996; Pennington & McConachie, 1999; Tannock, 1988). For example, caregivers have been shown to produce more non-contingent turns and less facilitative turns when interacting with children with a range of developmental delays and language impairment (Girolametto & Tannock, 1994; Leifer & Lewis, 1983; Pennington & McConachie, 1999; Tannock, 1988; Watson, 1998).

Drawing on the importance of caregiver-child conversations in children's development, several language intervention programmes that emphasize the role of caregivers in stimulating children's language development have been developed (Brady, et al., 2009; Norris & Hoffman, 1990a). The efficacy of these programmes has been ascertained through charting improvements in the way caregivers engage their children in interactions, how they use facilitative techniques in interactions, their children's ability to initiate

communication attempts and respond to their caregivers, and their children's language development (Aldred, Green, & Adams, 2004; Dale, Crain-Thoreson, Notari-Syverson, & Cole, 1996; Fey et al., 2006; Girolametto & Weitzman, 2006; Hancock, Kaiser, & Delaney, 2002; P. Peterson, Carta, & Greenwood, 2005; Yoder & McDuffie, 2008). However, these studies do not attempt to document the more precise means by which caregivers' conversational turns and facilitative techniques mediate their children's ability to engage in topically contingent conversations. This thesis attempts to address this lack.

1.2 Analysing caregiver-child conversations

1.2.1 Theoretical frameworks for analysing conversations

Conversation is composed of an orderly set of structures contributed spontaneously by the individuals who participate in it (H. H. Clark, 1992). The order of these structures appear to follow a conventional sequence which seems to be agreed upon across speakers (Leinonen, et al., 2000). These rules have enabled investigation of various aspects of conversations, using different theoretical approaches and analytical methods from fields including anthropology, sociology, linguistics, psychology and speech-communication (Perkins, 1998).

Well-established approaches to studying conversation include Conversation Analysis (Sacks, Schegloff, & Jefferson, 1974; Schegloff, 1996) and Discourse Analysis (Coulthard & Brazil, 1992; Sinclair & Coulthard, 1992). Conversational analysis (CA) provides frameworks for transcription and analysis of conversational structures that involve integration of the speakers' utterances with suprasegmental features such as prosody and pause duration (Jefferson, 1989; Sacks, et al., 1974) and other accompanying behaviours such as eye-gaze and body movement, or any use of communication aids such as speech devices (Wilkinson, 2008). Discourse Analysis (DA) goes beyond CA in that it involves analysis not just of conversation, but other types of discourse including narration, and other oral or written texts (Sinclair & Coulthard, 1992). Despite DA's focus on broader language practices, Coulthard & Sinclair (1992) argued that DA also entails specific frameworks for the analysis of conversations, such as the classification of the type of conversational turns.

Although distinct, CA and DA overlap in many areas. For instance, both analyses focus explicitly on the sequential organisation of conversational structures (Coulthard &

Brazil, 1992; Wooffit, 2005). Specifically, both approaches analyse the conversational *exchange.* The exchange is one of the basic units in conversation and it comprises a sequence of turns contributed by a minimum of two speakers (Leinonen, et al., 2000). While CA analyses conversations using two-part exchanges, DA analyses both two-part and three-part exchanges. The principle of the exchange has been used extensively to study caregiver-child conversations especially in analysing antecedent-consequent relationships in conversations. Examples of studies that utilised exchange include those that concern caregiver questions and child responses (Blewitt, Rump, Shealy, & Cook, 2009; Hoff-Ginsberg, 1986, 1990; Ornstein, et al., 2004; Yoder & Davies, 1990), caregivers use of facilitative techniques and child responses (Girolametto, Weitzman, Wiigs, & Pearce, 1999; McDuffie & Yoder, 2010), and caregivers and children's conversational turns (Pennington & McConachie, 1999, 2001a, 2001b; Pennington, Thomson, James, Martin, & McNally, 2009).

Another way of analysing conversations is by focusing on the *function* of utterances produced. Speech Act Theory (Austin, 1975) is one approach in which the specific functions or intentions of communicative utterances are examined. In this theory, communicative utterances can be classified into different types of speech acts such as naming, requests, persuasions, promises, advices, warnings, and apologies. Speech Act Theory further claims that in some situations, the sentence form may differ from its function. For example, if a speaker says "It is cold. Why don't you close the window?", although the latter utterance is in the form of a question, the function is actually a request or even a demand. Therefore, one needs to refer to the conversational context to understand the intention of the speaker and to respond appropriately to the speaker. While Speech Act Theory does not deal specifically with child language acquisition (Bohannon & Bonvillian, 2009), its principles have been applied in a range of studies involving caregiver-children interactions (e.g., Fey, 1986; Ninio, Snow, Pan, & Rollins, 1994; Pennington, et al., 2009).

A related approach to conversational analysis was proposed by Grice (1975) who argued that the participants of a conversation need to understand conversational implicatures (Leinonen, et al., 2000). Conversational implicatures are meanings that cannot be interpreted solely from the linguistic units of an utterance. In the example above, when the speaker says, "It is cold" the hearer, assuming that the statement cannot be taken at face value, draws the implicature that another message must be intended; one that is, in this case, substantiated by the following utterance. Grice suggested that speakers and hearers are able to interpret each others' meanings in this way because they abide by a common Cooperative Principle made

up of a set of rules or maxims. These are the maxims of Quantity, Quality, Manner and Relation. The maxim of Quantity states that a communicative utterance should consist of the right amount of information for the listener, instead of being under- or over-informative; the maxim of Quality states that a communicative utterance should be true to the conversational context; the maxim of Manner states that a communicative utterance should carry an explicit meaning; and the maxim of Relation states that a communicative utterance should be relevant to the conversational context. Examples of the application of Grice's maxims in the investigation of children's conversational skills include a study that looked at the understanding of children's referential communication (Davies & Katsos, 2010) and children's production of contingent replies (P. Dunham & Dunham, 1996).

A more recent approach to analysing communicative utterances is Relevance Theory (RT; Sperber & Wilson, 1995) which takes Grice's approach as its starting point, but instead of a Cooperative Principle argues that the maxim of Relation can subsume all the other maxims. RT argues that every utterance intended to be communicative, guarantees to the listener that it is optimally relevant and therefore that its interpretation can be arrived at with minimal effort (Leinonen & Ryder, 2008). Utterances that are *contingent* with the preceding turn because they follow the conversational partner's focus of attention (Rollins, 2003) and contain immediately accessible linguistic and non-linguistic information are by definition highly relevant (Leinonen & Ryder, 2008; Sperber & Wilson, 1995). Examples of RT application to children's conversations include investigation of children's comprehension of wh-questions (Ryder & Leinonen, 2003), referencing skills (Schelletter & Leinonen, 2003); and assessment of children's pragmatic skills (Ryder, Leinonen, & Schulz, 2008).

While each of these theoretical frameworks has a slightly different focus, they can each contribute to the analysis of caregiver-child conversations (Perkins, 1998). In this thesis, ideas drawn from CA and RT have been used to analyse the changes in conversational turns across time, and to understand how caregivers' turns influence their children's subsequent turns. The two-part exchange of CA (Sacks, 2010; Sacks, et al., 1974; Schegloff, 2000; Sidnell, 2010) has been used to analyse the interaction between adults' turns and children's turns together with the notion of individual perceptions of relevancy as a basis for contingency from RT (Leinonen & Ryder, 2008; Sperber & Wilson, 1995). While CA does not emphasise cognitive aspects of conversations the ways that RT does, Schegloff (2006) claimed that it provides an appropriate ground for inclusion of cognitive interpretation of the conversational data. Specifically, by using both approaches, we can investigate the changes in

turn construction across time, and between speakers with different developmental levels, such as in conversations involving a caregiver and a child with language difficulties. The application of CA and RT can help us understand how caregivers and adults' conversational abilities influence children's ability to maintain contingency in conversations. The following section reviews two key conversational elements important to the studies of this thesis, (i) conversational topics and (ii) conversational turns.

1.2.2 Conversational topics

Conversations are composed of conversational topics, which Keenan & Schieffelin (1976, p. 338) defined as "the proposition (or a set of propositions) about which the speaker is either providing or requesting new information". Topics can be identified from the "question of immediate concern or the centre of attention of utterances and turns" (Brinton & Fujiki, 1984). Turns are utterances (accompanied by other communicative acts) produced by a speaker as the speaker holds the conversational floor (Girolametto, 1988). In the conversation below (Example 1.1), the question of immediate concern of the speakers from line 1 to 3 is "chips" and they moved to talking about "what they have in their hands" from line 4 to 6.

Example 1.1 (Source: Brinton & Fujiki, 1984, p. 353)

1	Speaker 1:	you can have mine if you let me have one of yours.	***(Topic: Chips.)***
2	Speaker 2:	ok.	
3	Speaker 1:	ok, here's yours.	
4	Speaker 2:	I got a rattlesnake.	***(Topic: What I have in my hand.)***
5	Speaker 1:	well, I got a cobra snake.	
6	Speaker 2:	and I got a snake.	

A topic may also refer to the type of activity that the speakers are engaged in (H. H. Clark, 1992). For instance, a caregiver who is changing the child's nappy may talk about clothing or the changing process with the child. Although on the surface, a topic of conversation may seem obvious, the identification of topics can be made difficult by problems that are related to (i) the selection of an appropriate reference in an utterance or a cluster of utterances, as the topic; (ii) constant changes of topics in conversation per se; and (iii) mismatch between the subject matter of the conversation and the activity the individuals are engaged in (Schegloff, 1990).

The conversational topics in early caregiver-child conversations often revolve around routines and familiar activities (Bruner, 1983; Spagnola & Fiese, 2007) which have highly predictable turns and help children to know what to expect from their interactional partner as well as what is expected of them in these activities (Bruner, 1983). Their predictability also facilitates the production of contingent contributions to the conversational topic. However, changes in topic are common in conversations and it is through this process that a conversation ends up quite differently from where it started (Hobbs, 1990). This happens through the conversational turns produced by the speakers.

1.2.3 Conversational turns

Conversational turns are one of the basic units of conversations (Sidnell, 2010). According to CA, a turn is constructed by verbal units such as sentential, clausal, phrasal and lexical units (Sacks, et al., 1974; Schegloff, 2000). In addition to verbal units, H.H. Clark (1992) highlighted the importance of including non-verbal turns in conversations because of their potential to invite the next turn from another speaker. As argued within RT, however, the semantic meaning of the units in turns can only be inferred from the context (Sperber & Wilson, 1995) including the immediate environment where the conversation takes place, the activity of the participants, the content and structure of the turn, the speaker's mannerism, and the listener's and speaker's world knowledge and past experiences. To produce a turn that helps the listener to infer meaning effectively, the speaker has to be able to (i) reflect an awareness of the listener's previous knowledge and contextual information that is available to the listener (i.e., also known as ***presuppositional skills***) and (ii) judge how an intention should be expressed, the amount of information to be given, which linguistic forms to use and how the expressed utterance would interact with the conversational context (Adams, 2002; Landa, 2005).

While comprehending and producing turns, the listener and speaker collaborate to take the conversational floor with minimal or acceptable interruptions (known as overlaps; Sacks, 2010; Schegloff, 2000) resulting in a sequence of turns. According to CA, this turn sequence can be broken into a series of two-part exchanges or adjacency pairs. An adjacency pair consists of two turns that are adjacent to each other, contributed by different speakers and contingently related to each other (Sacks, 2010; Schegloff, 2000; Sidnell, 2010). The turns in an adjacency pair are ***contingent*** with each other because the first turn provides a

condition that sets up an expectation of a relevant response (Sperber & Wilson, 1995) and increases the likelihood of the construction of a relevant next turn by the listener (Schegloff, 2000). The classic adjacency pair is a question followed by a response (Sidnell, 2010). When the expectation set up by the first turn is not met by the subsequent speaker, a missing turn is obviously noticeable (Sidnell, 2010). The concept of adjacency pairs contributes to microanalysis of the sequential structure and content in conversations, and how they contribute to shaping conversational topics. Turns that manage conversational topics can be classified as *topic initiation*, *topic extension* and *topic maintaining responses*. These turns are important for examining conversational contingency because of their respective roles in changing, shading or maintaining the conversational topic. While these will be discussed in detail in the next chapter a preliminary review is useful here.

(i) Topic initiation

A conversational topic is introduced by a topic initiation (Keenan & Schieffelin, 1976; Leinonen, et al., 2000; McTear, 1985). A topic initiation is not related to, and does not draw on, the preceding turn and topic. It changes the question of immediate concern of the preceding conversational topic completely and thus is a turn that is not contingent to the preceding turn and topic. A topic can be reinitiated later in the conversation (Brinton & Fujiki, 1984; Keenan & Schieffelin, 1976; McTear, 1985).

(ii) Topic extension

A topic extension occurs when the question of immediate concern of the current topic goes through a step-wise modification (H. H. Clark, 1992; Hobbs, 1990; Schegloff, 1990; Sidnell, 2010) by taking the presupposition of the immediately preceding turn but adding new information that may or may not be contingent to the preceding turn or topic (Fey, 1986). It is topic extensions that most often change conversational topics through a series of successive small transitions from the preceding topic (H. H. Clark, 1992; Hobbs, 1990; Schegloff, 1990; Sidnell, 2010).

In the literature, topic extension has been described using different terminologies and different frameworks creating a lack of consensus on the terminology and definition of topic extension. Terms such as incorporated topic discourse (Keenan & Schieffelin, 1976); topic shading (Brinton & Fujiki, 1984; Schegloff, 1990); response/initiation (Sinclair & Coulthard, 1992); topic extension (Fey, 1986; Girolametto, Weitzman, van Lieshout, & Duff, 2000); topic drift (Hobbs, 1990; Reichman, 1990) or topic shift (H. H. Clark, 1992; Sidnell, 2010, pp. 233-244); and, tangential response (Letts & Reid, 1994) are some that have been used.

Fey (1986) argued for two types of topic extensions: (i) contingent topic extensions and (ii) tangential topic extensions. *Contingent topic extensions* add new semantic details to the preceding utterances and ***shade*** the question of immediate concern to another relevant topic. Others have referred to this in terms of a series of subtopics within a larger topic (Reichman, 1990). For example, when a topic is shaded from "placing an order in a restaurant" to "eating the food", there is a relevant sequential and temporal link between these two topics (Slackman, Hudson, & Fivush, 1986). *Tangential topic extensions* are, as the name implies *tangentially* related to parts of the preceding turn and "do(es) not seem to extend the topic in an adequate manner" (Fey, 1986, p. 73). Even though tangential topic extensions are extended from some aspects of the preceding turn, they do not share the semantic context of that turn (Dorval & Eckerman, 1984; Letts & Reid, 1994) and do not have any sequential, temporal or causal connections with the preceding turn and topic. Hence, they introduce new topics that can stand alone rather than being contingently linked to the preceding topic. An example of a tangential shift is when a topic is changed from "placing an order in a restaurant" to "what cats like to eat". Therefore, a tangential topic extension can be seen as a non-contingent turn, just like topic initiation.

(iii) Topic maintaining response

Following topic initiation or topic extension, the next turn by another speaker that is semantically contingent and maintains the topic is a topic maintaining response. A topic maintaining response may be followed by more responses that share the conversational topic.

While topic change is typical in conversations, high production of topic initiations or tangential extensions by a speaker may disrupt the flow of the conversation, and limit the listener's ability to follow the conversation effectively. Because topic initiations and tangential topic extensions lack contingency with the preceding turn, for the purpose of analysing topic contingency, they are grouped as *topic changes* in this thesis (described later in Chapter 2). On the other hand, contingent topic extensions and topic maintaining responses are contingent with the preceding turn. As contingent turns increase the likelihood of occurrence of a subsequent turn by the listener (Harrist & Waugh, 2002), it is hypothesised that a contingent topic extension and a topic maintaining response may have a higher chance of inviting the next speaker to take the conversational floor than a topic change. Both contingent topic extensions (labelled as *topic extensions* in Chapter 2 and thereafter) and topic maintaining responses are analysed individually because of their distinct roles in shading or maintaining conversational topics.

1.2.4 Section summary

Although conversation is a daily activity engaged in by all humans in one form or other, it is a sophisticated discourse form that shifts and changes across even the most routine exchanges. There are a number of theories that can shed light on conversation. Two theories, CA and RT have been identified as being of particular interest for this thesis. Using these theories, conversational outcome measures such as conversational topic (Brinton & Fujiki, 1984; Keenan & Schieffelin, 1976; Schegloff, 1990) and conversational turns (Brinton & Fujiki, 1984; Fey, 1986; Keenan & Schieffelin, 1976; Leinonen, et al., 2000) at the production level can be analysed. While the question of immediate concern of conversational turns determines the conversational topic, the type of conversational turns determines whether the conversational topic is changed, contingently extended, or maintained.

In order to understand how caregivers influence children's conversational contingency, it is important first, to look at the development of children's conversational skills. This is the topic of the next section.

1.3 The development of conversational skills

1.3.1 The development of joint attention and intentional communication

The development of conversational skills begins in early infancy, with joint attention being the fundamental skill (Farrant, Maybery, & Fletcher, 2011; Greenspan & Shanker, 2007; Tomasello, 1988). Joint attention is achieved when one shares the focus of attention with another. It may involve being aware of the other person's interest, coordinating visual attention to the event or object that the conversational partner person is attending to, and sharing interest and social engagement with the conversational partner (Schertz & Odom, 2004). Children's development of joint attentional skills is scaffolded by their caregivers in their early interactions, and infants learn to initiate communication bids and respond to their caregivers communication bids using prelinguistic means such as gestures, facial expressions, body, movements etc. (Brady, Steeples, & Fleming, 2005; Harrist & Waugh, 2002; Mundy & Willoughby, 1998; Volterra, Caselli, Capirci, & Pizzuto, 2005).

In early infancy, infants are able to collaborate in proto-conversations: sequences of simple turns involving brief joint attention with their caregivers (Bateson, 1979). A key stage is reached around nine months of age when they are able to coordinate attention among themselves, caregiver and a desired object, such as repeatedly looking at the mother's face after receiving an object and pausing to acknowledge receipt. This is often termed the emergence of secondary intersubjectivity (Trevarthen & Hubley, 1978). Then, from the age of 12 months old onwards, infants begin to use verbal language in their interaction (Tomasello, 1988) and integrate information from their previous joint-engagement with a person to produce contingent turns in their next interaction with that person (Liebal, Carpenter, & Tomasello, 2010; Liszkowski, Carpenter, & Tomasello, 2008; Moll & Tomasello, 2007). The advancement of these skills help them to verbally share their experiences with a listener (Tomasello, 1988) and at two years old, they can participate in conversations using contingent turns that contain additional information and maintain that topic through continuous joint attention with that person (Tomasello, 1988). Therefore, children's joint attentional skill is fundamental to their ability to develop conversational topics through topic initiation, contingent topic extension and topic maintaining responses (Tomasello, 1988).

1.3.2 The development of conversational topics

Infants' earliest interactional topics are focused on themselves, because before the development of secondary intersubjectivity, infants are only capable of interacting by using basic attention getting strategies (e.g., crying) combined with gaze (Foster, 1986). As their awareness of their surroundings develop and with the development of secondary intersubjectivity, they expand their focus of attention to what is happening in their immediate environment (Foster, 1986; Ninio & Snow, 1996). For example, from crying because of hunger, they are able to request food from their caregiver (Foster, 1986). They also shift to using more advanced strategies such as negotiating and discussing the activity they are engaged in (Ninio & Snow, 1996). Finally, at around the age of two years old, with the development of true conversational skills, they also begin to talk about topics that refer to objects, persons, or places displaced from their immediate spatial and/or temporal context (Adamson & Bakeman, 2006; Foster, 1986; Ninio & Snow, 1996). It is argued that these displacement topics are produced to a greater extent in routines (Lucariello, 1990). The rate of talking about displacement topics increases with age (Ninio, et al., 1994) and children gradually talk more about internal states such as feelings, thoughts or perceptions, and topics about the near future too (Adamson & Bakeman, 2006).

It is claimed that children's development of displacement topics is closely related to the development of event representation and script knowledge (Fivush & Slackman, 1986; Lucariello, 1990; K. Nelson, 1986; K. Nelson & Gruendel, 1986; Slackman, et al., 1986). Event representation is the cognitive representation of a person's past experiences, and scripts are the expression of these past experiences in language (K. Nelson, 1986). Children retrieve elements from past experiences and integrate them with the current event to construct a conversational script that is not bounded by their immediate environment but still contingent with it. For example, when reading a book about birthdays, a child may extend the topic to a real experience in a birthday party. By four years old, children's conversational topics extend to enacting scenarios, problem solving, discussing boundaries or rules, discussing themes, and discussing the child's state of emotions or opinions (Schober-Peterson & Johnson, 1989). These findings indicate that the development of displacement topics involve a complex integration of language, cognitive and social-emotional development.

1.3.3 The development of topic initiation

The development of topic initiation begins with initiation of joint attentional bids in early infancy through preverbal means, such as facial expressions, gestures and vocalisations to seek their caregivers' responses, and positive affect such as laughter, comments, smiles and eye contact, (Mundy & Willoughby, 1998; Wetherby, Reichle, & Pierce, 1998). These prelinguistic initiations are positively associated with the later development of conversational repairs and conversational topic initiations in their future communication skills (Brady, et al., 2005).

Studies have shown that the number of children's prelinguistic initiations increases with age (Ninio & Snow, 1996; Wetherby, Cain, Yonclas, & Walker, 1988). For example, at eight months old, they rely less on their caregivers to initiate interactions than at six months old (Saxon, et al., 2000). Their ability to increase initiation of communication bids reflects an increase in conversational assertiveness, i.e., the ability to assert some level of control or dominance in conversations without any solicitation from the conversational partner (Fey, 1986). It has even been reported that five year olds produce higher rates of topic initiations than adults (Brinton & Fujiki, 1984). However, this may be caused by their limitations in constructing longer interactional sequences (McTear, 1985) thereby causing them to change topics abruptly and unexpectedly (Dorval & Eckerman, 1984). It is also important to remember that even though conversational assertiveness increases with age, children's willingness to be assertive varies widely among individuals, as it does among adults (Ninio & Snow, 1996).

With age, children's ability to introduce topics not only changes in quantity but in quality too. Using conversational data from two 4 year old children, McTear (1985) documented that they used a range of devices including eye-contact, vowel lengthening, attention getting words such as "hey" and vocatives, non-verbal gestures such as pointing and showing, and relative clauses to initiate topics. McTear (1985) further reported that when they did not receive a response or received an unsatisfactory response, the children tended to reinitiate the conversational topic. Then as their language skills increase, children begin to incorporate cohesive devices (Halliday & Hasan, 1976) such as names, deictic pronouns or adverbs, expressive particles, greeting terms, locating directives and interrogatives into topic initiations (McTear, 1985; Ninio & Snow, 1996). At four years old, they are able to use sentence-initial *and* or repetitive *and then* as floor holders when initiating topics (Ninio &

Snow, 1996). The use of these cohesive devices also helps children to shade the preceding topic to another topic in a contingent manner rather than abruptly introducing a new topic.

1.3.4 The development of contingent topic extension

Contingent topic extensions allow the shading of conversational topics into a series of related topics. Although there are two types of topic extension, i.e., contingent and tangential topic extension, this section will only review the development of the former because of its role in shading conversational topics contingently. Contingent topic extension reflects the speakers' ability to expand the scope of the preceding topic with additional and relevant information. However, in comparison with topic initiations and topic maintaining responses, less is known about how preschool children develop contingent topic extensions (Ninio & Snow, 1996).

The development of contingent topic extensions has been documented in two studies that examined children's interactions with their peers (i.e., Brinton & Fujiki, 1984; Dorval & Eckerman, 1984). While Brinton & Fujiki's (1984) study included five year old children, Dorval & Eckerman's (1984) study used school aged children. Both studies reported that children younger than nine years old tended to produce more tangential extensions than contingent extensions. In addition, Dorval & Eckerman reported that the quality of the children's contingent topic extensions improved with age. At the age of 14 to 15 years old, their use of explicit evaluation, elaboration, and questioning to contingently extend their conversational topics became significantly higher than children of younger age groups. The findings of studies by Brinton & Fujiki (1984) and Dorval & Eckerman (1984) suggest that even though contingent topic extension is a skill that children begin to gain in early childhood, it is probably mastered only during adolescence. Therefore, more data on how preschool children develop contingent topic extension through facilitation from their caregivers is needed. Ninio & Snow (1996) suggested that one way is via scaffolding. Caregivers can help children to generate related topics by asking appropriate questions, repairing breakdowns, or requesting elaboration.

Scaffolding of contingent topic extensions has been documented in routines where caregivers interpret their young children's behaviours by using utterances that are highly contextual and that extend the scope of the situation (Foster, 1986; Lucariello, et al., 1986). Children then store this information in their event representations and when the routine is

repeated, they retrieve this information to construct a script (Fivush & Slackman, 1986; K. Nelson & Gruendel, 1986). When constructing scripts to extend topics, it has been reported that young children (three-year-olds) rely heavily on the sequential order of event representation in their internal memory and are unable to use their event knowledge flexibly when the sequential order of a known script has to be changed to suit a novel situation (Fivush & Slackman, 1986). At five years old, this improves, and they are able to reorganise their event representation internally to produce scripts that are contingent on a new and familiar but not exactly similar situation (K. Nelson & Gruendel, 1986; Slackman, et al., 1986). Based on this argument, it is hypothesised that contingent topic extension emerges only when a child acquires the flexibility to reorganise the elements from his or her event representation. This does not imply that younger children are not able to extend topics independently in routines. It is just that their ability to do so may be driven more by the rigidity of a script sequence than by integrating past and current experience effectively.

1.3.5 The development of topic maintaining responses

As with contingent topic extensions, topic maintaining responses are contingent turns that involve shared attention between the caregiver and the child. It is shown that in typical caregiver-child interactions with children between the age of one and two years old, they engage in joint attention for only about two thirds of their total interaction time (Tomasello & Farrar, 1986). However it is inside this joint attentional period that they use higher conversational skills such as more utterances, words, object labelling, and conversational turns. Other than joint attention, it is also argued that children's ability to maintain a conversational topic is influenced by their capability to comprehend conversational turns and topics (Keenan & Schieffelin, 1976; Ninio & Snow, 1996) and to access relevant information (Leinonen & Ryder, 2008).

As with topic initiations, children's development of topic maintaining responses begins in early infancy. In early infancy, they produce fewer contingent responses than initiations (Wetherby, et al., 1988). This may be because they are easily distracted by novel events in the environment that inherently results in higher rates of topic initiations (Keenan & Schieffelin, 1976). At this stage, it was reported that caregivers scaffold their development of topic maintaining responses by producing more contingent responses than their children (P. Dunham, Dunham, & Curwin, 1993; Flynn, Masur, & Eichorst, 2004; Foster, 1986; Masur &

Olson, 2008; Masur & Rodemaker, 1999) even when the conversation seems more complex than the child's current skill level (Foster, 1986; Givón, 2003).

Not surprisingly, caregivers' non-contingent turns have been documented to be less facilitative in scaffolding children's topic maintaining responses (P. Dunham & Dunham, 1996). For instance, Brinton & Fujiki (1984) reported that both preschool and school-aged children have difficulty maintaining conversations contingently when the topic has been non-contingently changed by their conversational partner. Just like topic initiation, children increase their rate of topic maintaining responses (Wetherby, et al., 1988) and decrease their dependence on caregivers' scaffolding as their age increases (Ninio & Snow, 1996; Slackman, et al., 1986). Concurrently, with the increase in their proportion of topic maintaining responses within a conversational topic, they form longer conversational exchanges with their conversational partner (Dorval & Eckerman, 1984). Similar to contingent topic extensions, children are better at maintaining topics and form longer conversational exchanges in routines such as games, meals and book-reading (Foster, 1986). The repetitive nature of routines facilitates retrieval of elements from event representation for script construction in conversations (K. Nelson, 1986).

The quality of children's topic maintaining responses changes as a function of maturation. In the early one-word stage, due to their language limitations, young children rely on the construction of low level strategies such as word or vocal play, mutual repetitions, or other relatively 'contentless' talk to sustain social relations (Keenan & Klein, 1975; McTear, 1985; Ninio & Snow, 1996). By 20 months old, they progress to using more complicated structures such as turn repetition, answer to wh- and yes/no questions, request and proposal, refusal, and agreement (Ninio & Snow, 1996). By three years old onwards, children are able to take their partner's perspective into account when interpreting and formulating turns (Nilsen & Graham, 2009). Therefore they are able to provide contingent responses to questions by referring to information that is relevant from the conversational context (Ryder & Leinonen, 2003). These skills continue to progress with age and by five years old children can include complex and specific information in response to their conversational partner's questions (Nilsen & Graham, 2009; Ryder & Leinonen, 2003) as a result of both linguistic and cognitive development.

1.3.6 Section summary

The development of conversational skills begins with the development of joint-attentional skills in early caregiver-child interactions (Greenspan & Shanker, 2007; Tomasello, 1988). The development of joint attention eventually helps children to integrate information from the current conversational context with their past experiences (Liebal, et al., 2010; Liszkowski, et al., 2008; Moll & Tomasello, 2007; Tomasello, 1988) to initiate turns and contribute new information to maintain the conversational topic. This is when true conversational skills emerge (Tomasello, 1988) and it occurs at approximately two years old. At this stage, children are able to talk about both "here and now" and displacement topics (Adamson & Bakeman, 2006; Foster, 1986; Ninio & Snow, 1996; Schober-Peterson & Johnson, 1989) using different types of conversational turns i.e., topic initiation, contingent topic extension and topic maintaining responses. With age, they exhibit growing rates of topic initiations and topic maintaining responses (Foster, 1986; Ninio & Snow, 1996; Wetherby, et al., 1988), but the development of contingent topic extension in preschool children remains unclear. It is argued that children's development of conversational turns is supported by their caregivers' scaffolding strategies, especially in routines (Foster, 1986; Lucariello, et al., 1986). Children's ability to produce contingent topic extensions and topic maintaining responses is important because these turns help to ensure contingency across topics and turns.

1.4 Caregiver-child interactions

1.4.1 Child-directed speech (CDS)

Research has shown that caregivers' talk with their young children contain specific features that support children's development of communicative and language skills (Baldwin & Meyer, 2008; Saxton, 2009). The special nature of the speech directed to children has been known as *motherese* or more recently child-directed speech (CDS; Saxton, 2008). Girolametto and colleagues (2006; 1999) described the features of CDS using two alternative but compatible hypotheses: (i) structural hypothesis, and (ii) responsivity hypothesis.

(i) Structural hypothesis

The structural hypothesis focuses on the structural modifications in CDS (Girolametto & Weitzman, 2006; Girolametto, et al., 1999). They include phonological modifications; syntactic and semantic modifications; and contextual adaptations such as highly redundant utterances (Saxton, 2009). These modifications provide the child with language input whose complexity is within the child's zone of proximal development (ZPD; Vygotsky, 1978). Phonological modifications are used more with infants than with older children and they include exaggerated intonation and stress, higher pitch and a greater pitch range, slower speech with syllable lengthening, longer pauses and fewer dysfluencies. It was reported that these features provide salient auditory stimuli which help to engage and maintain the infant's attention, provide a soothing effect to modulate the infant's arousal level, help to communicate affect and emotional information to the infant, and help the infant to track and parse the speech stream for more effective processing of the caregiver's linguistic information (Fernald & Kuhl, 1987; Fernald, Taeschner, Dunn, & Papoušek, 1989; Schachner & Hannon, 2011).

Syntactic and semantic modifications include shorter and grammatically simpler utterances (Girolametto, et al., 1999; Saxton, 2009) and are usually used in conversations with toddlers and preschool children. Finally, contextual adaptations include highly redundant utterances (Saxton, 2009) which have been argued to increase the saliency of information in caregivers' language input (Gogate & Hollich, 2010; Hoff-Ginsberg, 1986). While caregivers' frequent repetition of syntactic constructions (e.g., noun phrase and verb phrase) has been shown to be correlated with children's use of the same construction (Cameron-Faulkner, Lieven, & Tomasello, 2003; Hoff-Ginsberg, 1986), less is known about caregivers' use of conversational turns in scaffolding children's production of contingent turns such as contingent topic extensions and topic maintaining responses.

(ii) Responsivity hypothesis

The responsivity hypothesis focuses on caregiver's responsiveness in caregiver-child conversations (Girolametto & Weitzman, 2006; Girolametto, et al.,

1999). Caregivers' responsiveness refers to caregiver's behaviours that are contingent with the child's behaviours (Brady, et al., 2009). Yoder, Warren, McCarthren, & Leew (1998) distinguished two types of conversational responsiveness in caregiver-child interactions: (i) non-linguistic responsiveness and (ii) linguistic responsiveness. *Non-linguistic responsiveness* includes imitation of children's facial expression, play or vocalisation, and non-imitative forms such as vocal turn-taking and short verbal acknowledgments. These caregiver acts acknowledge the child's behaviours but do not provide the child with significant linguistic input. It was argued that non-linguistic responsiveness facilitates contingency, cause-and-effect, exploration of the environment, joint attention (Craig & Gallagher, 1982; Yoder, et al., 1998) and frequency of intentional turns (Yoder, McCathren, Warren, & Watson, 2001) in conversations.

Linguistic responsiveness consists of *verbal input* that is directed either at the child's focus of attention or the child's communicative intention (Yoder, et al., 1998). As this verbal input is topically contingent and temporally coordinated with the child's behaviours, it is suggested that the child does not have to switch to a new focus of attention that may demand additional cognitive effort. It is argued that linguistic responsiveness matches the child's processing mechanism and thus facilitates processing of the caregiver's input (Girolametto & Weitzman, 2006; Girolametto, et al., 1999). In addition, these turns may be perceived by the child as a form of pragmatically appropriate response to their preceding turn (Brady, et al., 2009; Pan, Sokolov, Rollins, & Snow, 1991, April; Užgiris, Broome, & Kruper, 1989), so they are likely to motivate the child to reciprocate with even more contingent turns (Brady, et al., 2009; Curcio & Paccia, 1987; P. Dunham & Dunham, 1996; Rocissano & Yatchmink, 1984; Yoder & Davies, 1990) and with more pragmatic functions such as requests (Matthews, Lieven, & Tomasello, 2007). While several aspects of language development (e.g., vocabulary, semantics, syntax and literacy) have been widely shown to be associated with caregivers' linguistic responsiveness (Akhtar, Carpenter, & Tomasello, 1996; Akhtar, Dunham, & Dunham, 1991; P. Dunham, et al., 1993; Fewell & Deutscher, 2004; Reese, Sparks, & Leyva, 2010; Rollins, 2003; Ruston & Schwanenflugel, 2010; Tamis-LeMonda, Bornstein, & Baumwell, 2001; Tomasello, 2000; Tomasello & Farrar, 1986; Trautman & Rollins,

2006), more information is needed to understand the effects of caregivers' linguistic responsiveness on children's change in conversational contingency.

1.4.2 Facilitative techniques within caregivers' linguistic responsiveness

Linguistic responsiveness also includes facilitative techniques that can be classified according to their structural forms. Facilitative techniques can be categorised into two groups (i) follow-in comments and (ii) follow-in directives (McCarthren, et al., 1995; McDuffie & Yoder, 2010; Yoder & Warren, 1998). This section will review these two types of facilitative techniques.

(i) Follow-in comments

Follow-in comments are facilitative techniques that contain semantically related linguistic information to map the child's behaviour or focus of attention (McDuffie & Yoder, 2010; Yoder, et al., 1998). They do not carry any social obligation for the child to respond. Pragmatically, follow-in comments used by caregivers are correlated with children's social-communication skills, understanding of social rules, perspective taking, and social-emotional regulation (Black & Logan, 1995; Bornstein, Tamis-LeMonda, Hahn, & Haynes, 2008; Harrist & Waugh, 2002; Mahoney, Kim, & Lin, 2007; Moll & Tomasello, 2007; Schertz & Odom, 2004; Tomasello, 1988). Types of follow-in comments that have been shown to be facilitative include imitation (Girolametto, et al., 1999; McDuffie & Yoder, 2010), expansion (Girolametto, et al., 1999; Hoff-Ginsberg, 1986, 1990; Loeb & Armstrong, 2001), and conversational recasting (Hassink & Leonard, 2010; Ruston & Schwanenflugel, 2010). A description of these techniques follows.

Imitation is repetition of the conversational partner's utterances (Užgiris, et al., 1989). Caregivers' imitations are positively associated with opportunities present in caregiver-child interactions (Flynn, et al., 2004) and it was found that they produce imitations to confirm their children's communication intention and structure of utterances, or to correct their children's errors (E. V. Clark & Bernicot, 2008). In typical caregiver-child conversations, caregivers' use of imitation has been documented as prominent when a child is at the Mean Length of Utterance (MLU)

stage of 1.0 to 2.6 (Užgiris, et al., 1989). Caregivers' imitations are highly correlated with children's return imitation (Folger & Chapman, 1978; Užgiris, et al., 1989). Specifically, imitations have been reported to be positively associated with the total number of child utterances in conversations (Girolametto, et al., 1999) and displacement topics (Tamis-LeMonda, et al., 2001). Although the impact on topic contingency has not been specifically explored, given the effect of imitation described above, improvements in topic maintenance and possibly topic extension would be expected.

Expansion is an utterance that repeats all or part of the child's preceding utterance with the addition of semantic and/or syntactic information e.g., Child: "Car." Mother: "Yes, that's a big car" (Scherer & Olswang, 1984). Užgiris, et al. (1989) reported that caregivers' repetition of their 18 month old children's utterances mainly included expansions and claimed that the caregivers' expansions were facilitated by their children's advancement to the one-word phase. Specifically, expansions are correlated with children's contingent responses in the form of imitation (Scherer & Olswang, 1984). In relation to children's preceding utterances, it was found that expansion is correlated with children's MLU and speech intelligibility, but not with their preceding contingent responses (Yoder, Klee, Hooshyar, & Schaffer, 1997).

Conversational recastings are similar to expansions in that they contain additional semantic and/or grammatical but they differ from expansions in that they reformulate the child's immature or incorrect production e.g., Child: It is raining. Mother: Is it raining? (Farrar, 1990). Because of these overlapping features, Conti-Ramsden (1990) claimed that expansions are a subset of simple recasts. Conversational recastings are incorporated in intervention that targets children's development of grammar (Camarata & Nelson, 2006; Hassink & Leonard, 2010; Ruston & Schwanenflugel, 2010) but have not been documented in intervention that targets conversational contingency. One of the possible reasons for this could be that conversational recastings naturally emphasise providing specific grammatical input to the child.

(ii) Follow-in directives

Similar to follow-in comments, follow-in directives also share the child's focus of attention but differ by carrying an obligation that the child must do, say or attend to something (McCarthren, et al., 1995; McDuffie & Yoder, 2010). Examples of follow-in directives that are associated with language acquisition are wh-questions (Hoff-Ginsberg, 1986, 1990; McDuffie & Yoder, 2010; Yoder, Davies, Bishop, & Munson, 1994), cloze procedures (Bellon-Harn, Hoffman, & Harn, 2004; Bradshaw, Hoffman, & Norris, 1998), and requests (Blewitt, et al., 2009; Ornstein, et al., 2004) that follow the child's focus of attention. Although the influence of follow-in directives on topic contingency has not been directly studied, it would follow that if the child responded by extending or maintaining the conversational topic, topic contingency would be maintained.

Follow-in questions are prompts in the form of wh- structures that explicitly ask the child to provide information that is related to and/or extends the topic of the preceding turn (Yoder, Davies, & Bishop, 1992; Yoder, Davies, et al., 1994). Yoder and colleagues argued that follow-in questions exhibit the combined effects of a follow-in comment and question (e.g., social expectation for the child to respond, cue for turn allocation, and a rising intonational cue to command the child's attention). It was also claimed that wh-questions contain linguistic cues that narrow the selection of elements from the child's internal representation and therefore ease relevant turn formulation (Ornstein, et al., 2004; Ratner, 1984). While children's responses to wh-questions have been associated with their comprehension of wh-forms (Rowland, Pine, Lieven, & Theakston, 2003), Ratner (1984) claimed that questions that do not match the child's linguistic competence may still provide them with an opportunity to practise information retrieval even when the correct information is not retrieved. Specifically, follow-in questions have been shown to elicit more child contingent responses than follow-in comments (Yoder & Davies, 1990; Yoder, Davies, et al., 1994). It is argued that this is because follow-in questions require replies, therefore children may have paid more attention to the question forms (Hoff-Ginsberg, 1986) and the result is better topic maintenance. Follow-in questions are also positively associated with the acquisition of displacement topics (Ornstein, et al., 2004; C. Peterson & McCabe, 1994; Ratner, 1984; Tamis-LeMonda, et al., 2001).

Another type of follow-in directive that has been studied in the literature, and will be further investigated in this thesis, is *follow-in cloze procedures*. They are incomplete utterances that end with a significant pause and are meant to be completed by the child (Bellon-Harn, et al., 2004; Bradshaw, et al., 1998; Norris & Hoffman, 1990a). Follow-in cloze procedures may function like a follow-in question (Bellon-Harn, et al., 2004) and they are found to elicit contingent responses from children (Bellon-Harn, et al., 2004; Bradshaw, et al., 1998). The benefits of cloze procedures have been documented mainly in the context of shared book reading. Little is known however about the effects of cloze procedure within conversational contexts.

1.4.3 Directives

In contrast with facilitative techniques, CDS can also contain caregiver behaviours that have been argued to have adverse effects on children's conversational development. One of them is directives. Directives are verbal behaviours that explicitly solicit a response from the child and demand the child to follow the caregiver's focus of attention (Akhtar, et al., 1991; Mahoney & NevilleSmith, 1996; McCarthren, et al., 1995; Tomasello, 1988). They are non-contingent with the child's preceding act. It is argued that the use of directives may tax the child's cognitive abilities because of the additional effort needed to switch the child's focus of attention to the caregiver's.

Directives have been found to have neutral or negative facilitation effect on contingent responsiveness (Mahoney & NevilleSmith, 1996; Norris & Hoffman, 1990a; Rescorla & Fechnay, 1996). Specifically, caregivers' use of directives are correlated with their children's frequencies of uninvolvement in caregiver-child interactions (Rocissano & Yatchmink, 1984), and children's irrelevant turns, interruptions, simultaneous talking, and non-contingent responses in peer conversations (Black & Logan, 1995). Directives used in CDS include utterances that involve a completely new topic or those that are intended to redirect the focus of a child who is not attending to any object, person or activity to a new topic (McCarthren, et al., 1995). Examples of directives include topic initiations and tangential topic extensions.

1.4.4 Dyadic synchrony in CDS

The use of contingent responses and directives in CDS in typical interactions between caregivers and their children reflect a mutually regulated, reciprocal, and harmonious interactional pattern (Harrist & Waugh, 2002). This pattern is described as dyadic synchrony (Harrist & Waugh, 2002) or fine-tuning (Saxton, 2009; Snow, 1996). In CDS, the process of dyadic synchrony involves caregivers being continuously sensitive to their children's communicative needs and adjusting their language input accordingly (Saxton, 2009).

Dyadic synchrony begins in early infancy. In proto-conversations, caregivers match their body movements, affect and vocal patterns with the infants' responses (Harrist & Waugh, 2002). For example, a parent might smile and laugh along with a child's smiles. The positive affect that infants experience from these interactions motivate them to develop "self-initiated" cycles in interactions while negative affect acts as a signal for more behavioural attunement from their caregivers (Greenspan & Shanker, 2007; Harrist & Waugh, 2002). In the infancy stage, the responsibility for maintaining and coordinating interactions lies more with the caregivers (Harrist & Waugh, 2002) and it is this responsibility that helps caregivers to understand and practise dyadic synchrony from an early stage. In early childhood, dyadic synchrony changes again as children take more active part in caregiver-child interactions. At this stage, caregivers' linguistic responsiveness becomes even more crucial for language development as it was shown that it predicts children's conversational and other aspects of language development, more than caregivers' linguistic responsiveness to their children in infancy (Tamis-LeMonda, et al., 2001).

As caregivers fine-tune the types of conversational turns that they use to match their children's language maturation, they also match the type of facilitative techniques used with their children's responses. Penner (1987) found that caregivers tend to expand their children's ungrammatical utterances more frequently than grammatical utterances when interacting with younger children (i.e., children with MLU between 2 and 2.5) than older children (i.e., children with MLU between 3 and 3.5). Conversely, the same group of caregivers maintained and extended conversational topics more frequently following child grammatical than ungrammatical utterances, when interacting with younger children. In another study, it was found that caregivers are more likely to produce follow-in comments following child contingent responses than child initiations (Yoder & Davies, 1990). Yoder & Davies (1990) suggested that it is easier for caregivers to immediately interpret the meaning of young children's ill-formed, short and marginally intelligible utterances following child contingent

turns because the topic has been established. These findings suggest that caregivers' fine-tuning of facilitative techniques is influenced by their children's responses, which then supports their children's conversational and other aspects of language development even further.

The importance of fine-tuning of facilitative techniques in caregiver-child conversations is supported by several studies. For instance, Yoder et al. (2001) found that caregivers' non-linguistic responsiveness predicts children's intentional communication while their linguistic responsiveness predicts children's language development. These findings suggest that the nature of dyadic synchrony changes according to the child's capabilities and each stage of dyadic synchrony is fundamental to the advancement of the child's next developmental stage (Harrist & Waugh, 2002).

When dyadic synchrony is disrupted, children's development may be adversely affected. At the conversational level, a disruption in dyadic synchrony may affect the children's responses within that conversation itself. For instance, when caregivers appear uninvolved, their children tend to redirect their focus of attention to the preceding conversational topic conversation, and when caregivers' use higher number of directives, their frequency of child uninvolvement increases (Rocissano & Yatchmink, 1984). This disruption in dyadic synchrony can be further compounded when a child presents with conversational difficulties. The impact of children's conversational difficulties on caregiver-child conversations and the manifestations of children's conversational difficulties are reviewed in the next section.

1.4.5 Section summary

The role of caregiver's language input has been described focussing on the dynamic interaction between caregiver's input and child communication and language skills. Child directed speech (CDS) contains unique speech and language features (Saxton, 2009) that are phonologically salient for infants, syntactically and semantically simpler, and used repetitively in caregiver-child interactions (Fernald & Kuhl, 1987; Girolametto, et al., 1999; Saxton, 2009). CDS also contains contingent and responsive utterances that follow the child's focus of attention, therefore facilitate language processing with the least cognitive effort (Girolametto & Weitzman, 2006; Girolametto, et al., 1999; McCarthren, et al., 1995; Tomasello, 1988), and facilitate improvement in conversational skills (Brady, et al., 2005;

Matthews, et al., 2007; Tamis-LeMonda, et al., 2001; Yoder & Davies, 1990). Caregiver techniques have been categorised as "follow-in comments" e.g., imitation and expansion, and "follow-in directives" e.g., wh-questions and cloze procedures (McDuffie & Yoder, 2010; Yoder, et al., 1998). They contrast with directives, or turns that switch the child's focus of attention to that of the caregivers. These have been shown to have negative correlations with children's development of social-interaction skills (Mahoney & NevilleSmith, 1996; Tomasello, 1988).

The nature of CDS in caregiver-child interactions varies according to the children's communication capabilities and behaviours (Bohannon & Bonvillian, 2009; Harrist & Waugh, 2002; Sameroff, 2009; Saxton, 2009). This process is also known as dyadic synchrony or fine-tuning. It is an important process in caregiver-child interactions because it reflects caregivers' continuous sensitivity to the changes in their children's behaviour and development, and helps caregivers to continuously provide language input that is within the child's ZPD (Vygotsky, 1978).

1.5 Conversational difficulties

1.5.1 The impact of conversation difficulties on caregiver-child interaction

Although dyadic synchrony has been reported as a seemingly natural fine-tuning process in caregiver-child interactions, this process can be altered by several factors. One of the major factors is the quality of the child's conversational turns. Children with conversational difficulties have been reported to produce turns of compromised quality and quantity. Therefore, caregivers are more likely to use higher frequencies of directives when interacting with children with developmental delay and language impairment (Girolametto & Tannock, 1994; Tannock, 1988), ASD (Watson, 1998), Down syndrome (Leifer & Lewis, 1983) and non-speaking physically disabled children (Pennington & McConachie, 1999).

It has been argued that the change in caregivers' conversational styles when interacting with children with conversational difficulties may be caused by an "inadequate feedback loop" (Tannock & Girolametto, 1992; Vigil, et al., 2005). When caregivers are not aware that children with conversational difficulties may have difficulty processing or need a longer time to process the activity and their language input, they may feel they need to direct

the conversation as they assume that the child is unable to make further responses on the topic (Tannock & Girolametto, 1992; Vigil, et al., 2005). This compounds the problem because they may divert the child's focus of attention and subsequently increase the cognitive processing demand for the child. This then becomes a cycle in which the child needs more time, but the caregiver continually directs the topic in an attempt to get language feedback from the child. Thus the caregiver's fine-tuning strategy becomes an "idiosyncratic feedback cycle".

The idiosyncratic feedback cycle has been claimed to be related to children's level of responsiveness in conversations, instead of their developmental status (Mahoney & NevilleSmith, 1996; Pennington & McConachie, 1999; Tannock, 1988). For example, Tannock (1988) provided evidence that caregivers of children with Down syndrome produced high rates of directives because of their children's high levels of unengagement in conversations. Studies have also shown that caregivers of children with pragmatic difficulties but with higher language and conversational abilities are less likely to use highly directive behaviours than do caregivers of children with lower language and conversational abilities (Landry, et al., 2002; Mahoney, 1988; Rocissano & Yatchmink, 1983).

Contrary to the idiosyncratic feedback cycle, Siller & Sigman (2002) and Rescorla & Fechnay (1996) found no significant differences in dyadic synchrony in conversations between caregivers of children who are late talkers and typically developing children. They argued that caregivers of children with conversational difficulties are able to synchronise their conversations as much as caregivers of typically developing children. Other studies have found both similarities and differences in the conversational styles of caregivers of children with pragmatic difficulties and caregivers of typically developing children. For example, Vigil et. al (2005) found that although caregivers of children with language delay use more initiations, less responses, turns and expansions than do caregivers of typically developing children, both groups of caregivers use similar amounts of other contingent responses (i.e., questions, labelling, descriptive, gestures, directives, interpretations, imitations). Conti-Ramsden (1990) found that caregivers of language impaired children use similar amounts of simple recasts, imitations, contingent responses and initiations but less complex recasts than caregivers of typically developing children.

The ambiguity in findings of past studies regarding caregivers' interactions with children with pragmatic difficulties may reflect two possibilities. First, some studies in the

literature did not distinguish true directives from follow-in directives. Therefore the differences in caregivers' conversational styles may be obtained from different methodologies. It may be that high levels of follow-in directives are needed to engage children who are passive or inactive (Fey, 1986) and the data of those studies may have reflected this. Second, the quality of caregivers' language input is affected not only by children's pragmatic difficulties (Mahoney, et al., 2007) but other external and contextual factors such as caregiver's characteristics and their social-emotional functioning too (Bornstein, Hendricks, Haynes, & Painter, 2007; Rowe, 2008).

Regardless of the children's responsiveness, children who receive higher levels of responsiveness from their caregivers have been shown to present with better developmental milestones. For instance, Siller & Sigman (2002) found that caregivers' level of joint attention with their children with ASD at toddlerhood is positively correlated with their children's subsequent joint attention and language skills (Siller & Sigman, 2002). Similarly, Landry, et al. (2001) found that children of caregivers who are consistently responsive have higher and consistent rates of cognitive and social growth than children of caregivers who are inconsistently responsive or low in conversational responsiveness. They argued that caregivers who are consistently responsive to their children are more sensitive to their children's interest, more stimulating and less restrictive than caregivers who are inconsistently responsive or show low responsiveness to their children.

To summarise, the longitudinal changes in caregivers' responsiveness to their children can be independently predicted by both their children's responsiveness to their bids for joint attention and the caregivers' responsiveness to them (Siller & Sigman, 2008). Data from past findings showed that dyadic synchrony or caregivers' typical fine-tuning strategies may be altered by the lack of contingent responsiveness in children with conversational and/or language difficulties. However, caregivers who are able to fine-tune their language input to match their children's lower language capabilities in early caregiver-child interactions can help their children to gain better conversational and other language skills, and they are more likely to continue to do so at later stages. Therefore, several language intervention programmes focus on helping caregivers to improve their conversational skills, in order to mediate their children's conversational and language skills. The implementation and efficacy of these intervention programmes are reviewed later in the thesis.

1.5.2 The nature of conversational difficulties

As conversational difficulties in children alter dyadic synchrony in caregiver-child interactions, it is important that we understand the nature of these difficulties. Conversational difficulties in children can be manifested across many levels. According to the International Classification of Functioning, Disability and Health Children and Youth Version (ICF-CY; World Health Organization, 2007), a child's conversational difficulties may be caused by the complex interaction of the child's neurobiological limitations, participation in the environment to acquire language, and execute activities related to communication and build relationships with others (Dempsey & Skarakis-Doyle, 2010). These sources of difficulties may interact with one another and together with the child's other environmental factors, each child's conversational difficulties may present differently, even within the same aetiology. This section aims to describe the nature of conversational deficits according to Fey's (1986) social-conversational profile.

(i) Fey's (1986) social-conversational profile

Fey (1986) developed a scheme for profiling children's level of conversational participation according to their level of assertiveness and responsiveness in conversations. As described above, assertive turns are topic initiations that place constraints on how the conversational partner must respond to meet the child's social obligations. Responsiveness indicates the child's willingness and capability to attend to the details of the partner's turns and to process those details and independently formulate a contingent response, through topic extensions and topic maintaining responses. Fey stressed that grouping children's conversational behaviours in this way rather than by aetiological classification or developmental milestones addresses the issue of overlapping of conversational behaviours across aetiological diagnoses.

Fey's (1986) classification consists of four profiles: (i) *active conversationalists* who are assertive and responsive; (ii) *passive conversationalists*, who are responsive but non-assertive; (iii) *inactive communicators*, who are neither responsive nor assertive; and (iv) *verbal communicators* who use language but not effectively for communication. According to Fey, children who are *conversationally active* are able to initiate conversational topics to communicate interest in their

conversational partners and are motivated to share additional information with them. Of the four profiles mentioned above, only children who are conversationally active get the most opportunities to receive appropriate language input and to practice newly acquired language forms (Fey, 1986). For instance, McDonnell, Friel-Patti, & Rollins (2003) demonstrated that children's initiations and responses in routine book-reading are positively associated with their rate of vocabulary and conversational (i.e., initiations and contingent responses) growth. This shows that children's ability to balance initiations and responses with their conversational partners in conversations is therefore essential. Fey (1986) cautioned that this communication effectiveness is often built on the consistent conversational responsiveness extended by their conversational partner. Children who are active conversationalists are aware of the reciprocal nature of social-conversational interaction and therefore able to be assertive and responsive to their conversational partners.

According to Fey's (1986) profile, children who fall into the category of verbal communicators, passive conversationalists and inactive communicators present with imbalances in their turn production. Children who are *verbal communicators* produce high levels of initiations but are unresponsive to the needs of their conversational partners. These are children who often control the conversational floor without acknowledging the conversational partner's contributions or participation. Verbal communicators are frequently reported among children with ASD (Hale & Tager-Flusberg, 2005; Philofsky, Fidler, & Hepburn, 2007; J. E. Roberts et al., 2007) and Asperger syndrome (Adams, Green, Gilchrist, & Cox, 2002). The degree of their excessive initiations has been found to be positively associated with the severity of other ASD symptoms (Hale & Tager-Flusberg, 2005; Philofsky, et al., 2007).

Verbal communicators are also found among children with profound developmental and language delay (Ogletree, Wetherby, & Westling, 1992). Ogletree et al. found that their participants' turns were produced more for behavioural regulation (i.e., requesting for object, requesting for action, and protesting) than for social interaction (i.e., requesting for social routine, attention getting and greeting). Children who are verbal communicators may present with difficulties in joint attention (Koegel, Koegel, & McNerney, 2001; Ogletree, et al., 1992; Schertz & Odom, 2004; Warreyn, Roeyers, & De Groote, 2005). Poor joint attention may lead to underdevelopment of social-communication skills such as social referencing, Theory

of Mind, and inferencing others' communicative intentions (Miller, 2006; Schertz & Odom, 2004; Tomasello, 1988). When these skills are compromised, a child may not be aware of the conversational partner's mental states and perspectives and, therefore, may have difficulty collaborating on communication goals with the others and come across as irrelevant in conversations.

Passive conversationalists are children who are responsive but produce very few initiations (Fey, 1986). Therefore, they are able to engage in conversational topics fairly well but merely through responding to their conversational partner's bids for communication. In interactions with passive conversationalists and inactive communicators, the conversational partner needs to continuously solicit information from the child in order to sustain the conversational topic. Passive conversationalists have been documented in children with cognitive and language delays. For example, children with Down syndrome have been reported to present with relatively appropriate frequency of simple contingent responses but low initiations (J. E. Roberts, Martin, et al., 2007; Tannock, 1988). Children with specific language impairment (SLI) have also been documented to exhibit both passivity and inactivity in conversations. In their interactions with their peers, they produce significantly fewer verbal and non-verbal initiations even after receiving positive feedback from their peers (Liiva & Cleave, 2005) and relatively fewer responses than their peers (Brinton, Fujiki, & Higbee, 1998). It was also reported that they may produce more non-contingent responses that their peers, as a result of difficulty in making syntactic elaborations or using complex sentence forms (Bishop, Chan, Adams, Hartley, & Weir, 2000; Craig, 1991).

Passivity in conversations has also been documented in children with poor speech intelligibility such as those with cerebral palsy who have been shown to produce fewer initiations and simple contingent responses (Pennington & McConachie, 2001a, 2001b). It is argued that in the absence of cognitive and language delay, children's poor intelligibility does not elicit adequate feedback from their caregivers, which in turn reduces the children's motivation to be assertive. In a retrospective study that investigated the relationships between literacy skills and early conversational skills at three years old, Smith, Locke, & Farkas (2008) found that children with dyslexia present with a history of using low interaction strategies similar to children with SLI and of younger children, i.e., more non-simultaneous contingent

turns and less other types of speaking turns than did children without dyslexia. These findings suggest that low initiations and simple contingent responses may reflect cognitive deficits such as slower language processing and inability to access, retrieve, integrate or store extra information that is relevant to the conversational context.

Inactive communicators are children who produce low levels of initiations, contingent responses and topic extensions in conversations. Inactive communicators may present across several diagnoses. For instance, Adams et al. (2002) reported that, while they found both extremely high and typical rates of initiations in children with Asperger syndrome, they also found an extreme of low conversational initiation and responsiveness in a few of their participants. This variability shows that children with a particular diagnosis may present with a conversational profile that is different from what has been typically reported. Profiling children according to their conversational capability instead of diagnosis may therefore provide more specific information for planning and implementation of intervention for these children.

Fey (1986) stressed that the placement of a child on the continuum of assertiveness and responsiveness should not just reflect the child's age, cognitive abilities and formal linguistic skills, but the child's motivation to be assertive and responsive as well. Children classified in each of the groups may be different in respect to their diagnostic classification or their profiles or linguistic capabilities and are expected to exhibit variations in their language skills and developmental milestones. However, children with all these variations may still exhibit highly similar profiles in their social-conversational participation and may have the same impact on caregiver-child conversations.

(ii) Quality of conversational turns

The challenges that children with conversational difficulties exhibit are reflected not only in the rate of their conversational turns but in the quality of their turns too. They often have difficulties understanding and/or using words in context and exhibit a compromised ability in expressing ideas, which consequently cause them to resort to turns that are semantically and syntactically simpler.

Past studies concerning children with Down syndrome reported that they are more likely to produce contingent responses that contain information that is merely adequate to maintain the conversation but less likely to offer new information to the conversation (J. E. Roberts, Martin, et al., 2007), more likely to produce fewer descriptions when making references (Abbeduto et al., 2006) and more likely to produce fewer imitations (Sokolov, 1992). It has been suggested that children with Down syndrome may not be proficient in gauging the amount and type of information that they is needed to maintain a conversational topic (Abbeduto, Warren, & Conners, 2007), therefore leaving the responsibility of maintaining the topic with additional information to their conversational partner (Tannock, 1988). Meanwhile, past studies concerning children with SLI reported that they are more likely to produce fewer multi-utterance turns (Brinton, et al., 1998).

The findings of the above studies suggest that children who present with compromised language skills may present with inadequate linguistic resources to construct utterances that represent their communicative intent effectively. For instance, because of language limitations, children and young adults with Down syndrome and Fragile-X syndrome are likely to produce turns that are semantically and syntactically simpler, with lower MLU, and fewer verb and noun phrases (Abbeduto, et al., 2006; Finestack & Abbeduto, 2010). In another instance, Liiva & Cleave (2005) showed that children with SLI who have better receptive skills had a somewhat greater advantage in interpreting communicative bids directed at them by their peers. Craig & Evans (1993) reported that children with both receptive and expressive language difficulties present with simpler turn-taking behaviours (e.g., fewer conversational interruptions) and turn structures (e.g., fewer connective cohesive ties and more incomplete ties) than children with just expressive language difficulties. Similarly, children with cerebral palsy who have poor intelligibility are more likely to produce simple contingent responses to fulfil basic pragmatic functions such as answering yes/no questions, confirming, acknowledging and denying whereas children with better intelligibility use a wider range of communicative functions and produce more responses of higher quality such as provisions of information and requests (Pennington & McConachie, 2001a, 2001b). In another study involving children who were born preterm, it was demonstrated that those with higher language skills exhibit more semantically and syntactically complex turns and better topic

maintenance than those who were born preterm but with lower language skills (Rocissano & Yatchmink, 1983).

Children's cognitive and language limitations may also affect their inferencing capabilities and their ability to express pragmatic intentions (Botting & Adams, 2005; Ryder, et al., 2008). For instance, it was reported that children with SLI who present with low MLU produced less relevant utterances with fewer pronouns when making descriptions than their language-matched peers (Schelletter & Leinonen, 2003). In another study involving two children with semantic-pragmatic difficulties, Willcox & Mogfordbevan (1995) reported that they were likely to use immature and atypical strategies such as a lack of attention-getting devices when making initiations, using unusual grammatical forms to direct others, not responding to follow-in directives, and not repairing when conversational breakdowns occurred. It was also reported that children with SLI may be compensating their conversational difficulties with conversational behaviours of younger children, such as taking a long time to join an interaction, exhibiting high rates of onlooking behaviours (Liiva & Cleave, 2005), producing few overlapping turns (Craig & Evans, 1993), exhibiting frequent unrepaired interruptions (Craig, 1991) and incorporating few non-verbal communication strategies in conversations (Bishop, et al., 2000; Brinton, et al., 1998; Liiva & Cleave, 2005)

To summarise, the quality of children's conversational turns may be compromised by semantically and syntactically simpler sentences or immature conversational behaviours that are inadequate to meet the constant pragmatic adjustments in conversations.

1.5.3 Section summary

Conversational difficulties in children have been reported to alter the dynamics of typical dyadic synchrony in caregiver-child conversations. Because of children's inadequate responses, caregivers may use higher rates of directives in interactions (Girolametto & Tannock, 1994; Leifer & Lewis, 1983; Pennington & McConachie, 1999; Tannock, 1988; Watson, 1998). The significant relationships between caregivers' level of responsiveness and children's responsiveness in caregiver-child interactions suggest that caregivers who are able to fine-tune their CDS to meet their children's needs enhance their children's responsiveness,

thereby motivating the caregivers to be continuously responsive and match their language input with their children's capability (Girolametto & Tannock, 1994; Leifer & Lewis, 1983; Pennington & McConachie, 1999; Tannock, 1988; Watson, 1998).

Children's conversation difficulties may be classified according to Fey's (1986) social-conversational profile. In this profile, children who are verbal communicators are those who tend to produce high levels of initiations but low levels of responses. These children tend to change conversational topics frequently and this profile has been documented as being common in children with ASD (Hale & Tager-Flusberg, 2005; Philofsky, et al., 2007; J. E. Roberts, Martin, et al., 2007) and language impairment (Ogletree, et al., 1992). Meanwhile, children who are passive conversationalists are those who produce low level of initiations but high level of responsiveness, and children who are inactive communicators are those who present with low levels of initiations and responsiveness. Children who are more likely to have these profiles are those with Down syndrome (J. E. Roberts, Martin, et al., 2007; Tannock, 1988), SLI (Brinton, et al., 1998; Craig, 1991; Liiva & Cleave, 2005) or poor speech intelligibility (Pennington & McConachie, 2001a, 2001b). In addition to their level of assertiveness and responsiveness, children's quality of turns may also be compromised when they do not offer new information in conversations to maintain the conversation (Pennington & McConachie, 2001a, 2001b; J. E. Roberts, Martin, et al., 2007), have language limitations (Abbeduto, et al., 2006; Abbeduto, et al., 2007; Craig & Evans, 1993; Finestack & Abbeduto, 2010; Liiva & Cleave, 2005), have difficulties inferencing meanings (Ryder, et al., 2008) and use immature conversational strategies (Brinton & Fujiki, 1995; Liiva & Cleave, 2005).

1.6 Intervention for children with conversational difficulties

1.6.1 Types of intervention

Given the importance of conversational skills, to overall linguistic, cognitive, and social development (Givón, 2003; Gogate & Hollich, 2010; Greenspan & Shanker, 2007; K. Nelson, 1986; Thompson, 2006; Tomasello, 2000), it is vital to explore the effects of intervention on conversation. There are a number of ways intervention can be approached to improve children's conversational skills. Two common conversationally-based approaches are parent-implemented language interventions and direct language intervention. Drawing on the importance of dyadic synchrony in caregiver-child conversations, these approaches

advocate the use of contingent turns and facilitative techniques in the child's natural physical and linguistic environment to share the child's focus of attention (Norris & Hoffman, 1990b; Wilcox & Shannon, 1998). These naturalistic conversational based strategies help caregivers to create more opportunities for the child to communicate and provide natural consequences for the child's communication attempts thereby attempting to improve their level of assertiveness and responsiveness and enhance their ability to learn language.

Naturalistic conversational based intervention programmes can be classified according to the intervention procedures used. Wilcox & Shannon (1998) broadly grouped them into: (i) milieu teaching; (ii) focused stimulation, and (iii) global interaction techniques. Intervention procedures in milieu teaching originate from the behaviourist approach and they comprise a set of strategies that are used to elicit children's responses using behavioural moulding techniques (Fey, 1986; Wilcox & Shannon, 1998). Focused stimulation and global interaction techniques are based on the social-interactionist and transactional approaches. In focused stimulation, the child is directly tempted by the therapist to produce utterances containing target forms using facilitation techniques such as expansions and recasts (Fey, 1986; Paul, 2007; Wilcox & Shannon, 1998). Global interaction techniques, on the other hand, train children's primary caregivers to use facilitation techniques known to encourage language acquisition (Wilcox & Shannon, 1998). Based on these techniques, several intervention programmes have been developed, some incorporating a combination of the three intervention approaches. This section will discuss those programmes that focus on improving caregivers and children's conversational skills and caregivers' facilitative techniques through caregiver-implemented intervention and one-on-one caregiver-child intervention programmes.

(i) Caregiver-implemented intervention programmes.

Caregiver-implemented intervention programmes are those that use global interaction techniques or group training for caregivers as the predominant training method but incorporate other intervention techniques in their training. In a recent meta-analysis, M.Y. Roberts & Kaiser (2011), reported that caregiver-implemented interventions have significant positive impacts on caregivers' responsiveness, use of facilitative techniques and rate of communication. Significant positive impacts were

also found on children's receptive and expressive language skills, receptive and expressive vocabulary, expressive morpho-syntax, and rate of communication.

The Hanen Program for parents consists of a number of intervention programmes specific to different populations. One programme, It Takes Two to Talk® Hanen Program for Parents (ITTT; Manolson, 1992; Pepper & Weitzman, 2004), utilises two approaches: focused stimulation and global interaction techniques (Girolametto & Weitzman, 2006). It is aimed at providing education about the basic concepts of communication and language, early intervention and social support for the family of that child. In this programme, the speech-language therapist (SLT) teaches the caregivers to follow the child's lead, to use language facilitate techniques (e.g., waiting, imitation, expansion, and questions), and to select specific communication goals for their children.

Several studies have reported significant improvement in both caregivers and their children's language skills following the ITTT programme. Improvements included increased episodes of joint attention and mean length of joint attention (Girolametto, Verbey, & Tannock, 1994; McDade & McCarten, 1998); caregivers' increased responsiveness to children's communicative attempts, decreased directiveness, decreased uninvolved episodes, use of slower and less complex turns, incorporation of more target words (Girolametto, 1988; Girolametto, Pearce, & Weitzman, 1996; Pennington, et al., 2009; Tannock, Girolametto, & Siegel, 1992); and higher use of facilitative techniques such as responsive labelling, imitations, interpretations and expansions (McDade & McCarten, 1998). It was also shown that the caregivers were able to maintain the skills learnt post-intervention (Pennington, et al., 2009; Tannock, et al., 1992). Concomitantly, their children exhibited improvement in vocabulary development, morpho-syntactic complexity of their utterances (Girolametto, 1988; Girolametto, et al., 1996), participation with more turn production (Girolametto, 1988; Tannock, et al., 1992), turn initiations and making requests, provision of information (Girolametto, 1988; Pennington, et al., 2009), as well as responsiveness to their caregivers' conversational turns (Girolametto, 1988).

Other than the ITTT programme, other caregiver-implemented studies had also reported improvement in caregivers and children's initiation and responsiveness in conversations, caregivers' use of facilitative techniques and/or children's language

development (e.g., Aldred, et al., 2004; Arnold, et al., 1994; Dale, et al., 1996; Girolametto, Sussman, & Weitzman, 2007; McConachie, Randle, Hammal, & Le Couteur, 2005; Niccols & Mohamed, 2000; Whitehurst et al., 1988). This thesis aimed to investigate the conversational outcomes reported in the literature to a degree but it goes further by exploring how caregivers and children change their production of turns to build contingency between topics, and within a conversation. In addition, this thesis investigated whether or not children's development of topic contingency would change as their caregivers' change their rates of conversational turns and facilitative techniques.

(ii) One-on-one intervention programmes

One-on-one intervention programmes are those that provide individual training to the caregiver and child in intervention sessions. Examples of such programmes in the literature are the Responsivity Education/Prelinguistic Milieu Teaching (RE/PMT; Fey, et al., 2006; Warren et al., 2006), Enhanced Milieu Teaching (EMT; Hancock & Kaiser, 2006; Kaiser & Hester, 1994), and Responsive Teaching (RT; Mahoney, Perales, Wiggers, & Herman, 2006).

The RE/PMT and EMT programmes originate from the behaviourist, social-interactional and transactional theoretical perspectives, and are expanded from milieu teaching. RE/PMT is targeted at eliciting prelinguistic intentional behaviours that are essential for communication development (Warren, et al., 2006). It is suitable for children who are functioning developmentally between the ages of approximately nine and 15 months. Improvement following the RE/PMT intervention has been reported in children's development of intentional communication acts (Fey, et al., 2006; Yoder & Warren, 1998, 1999), which concomitantly improved their caregivers' responsiveness to their children (Yoder & Warren, 2001; Yoder, Warren, Kim, & Gazdag, 1994). EMT is targeted at children in the early stages of language development i.e., MLU of 1.0 to 3.5 (Hancock & Kaiser, 2006). It is positively associated with caregivers' improvement in responsive interaction and incidental teaching, and the children's improvement in conversational responsiveness and development of language skills such as vocabulary and MLU (Hancock & Kaiser, 2006; P. Peterson, et al., 2005; Yoder, Kaiser, Alpert, & Fischer, 1993). In a recent

study by Ingersoll (2011), it was found that in these expanded milieu teachings, milieu teaching itself facilitated more language development, topic-related responses, and requests whereas responsive interaction facilitated more child labelling or commenting. Another programme, RT, was designed to address the cognitive, language and social-emotional needs of young children with developmental problems through teaching caregivers to increase their responsiveness to their children (Kim & Mahoney, 2005; Mahoney, et al., 2006). This programme has been reported to shared engagement and responsiveness between caregiver-child dyads too but through scores from standardises tests (Kim & Mahoney, 2005; Mahoney & Perales, 2003, 2005).

In the one-on-one caregiver-child intervention programmes reported by Delaney & Kaiser (2001) and Hancock, et al. (2002), it was revealed that the caregivers improved their use of responsive feedback, follow-in comments, expansions and structurally appropriate utterances, provided more waiting opportunities for their children and used fewer negatives and directives following intervention. Concomitantly, improvement in the children's pragmatic skills such as increased active participation in interactions and better turn-taking skills were reported. In addition, it was also reported that these programmes help to decrease caregivers' stress and decrease children's non-compliant behaviours. Kashinath, Woods, & Goldstein (2006) documented effective generalisation of the caregivers' conversational strategies in other routines and improvement in the children's vocabulary skills, following their one-on-one caregiver-child intervention programme.

The studies reviewed above indicated that through direct language intervention, children's initiation of intentional communication and responsiveness to caregivers' conversational turns can be mediated through their caregivers' responsiveness to their communication attempts, caregivers' use of facilitative techniques, and caregivers' modification of the complexity of their language structures. However, like studies of caregiver-implemented intervention programmes, more information is needed to describe the overall change in the caregivers and children's ability to achieve conversational contingency and whether children's development of topic contingency will change as their caregivers' conversational turns and facilitative techniques change.

Appendix A summarises the findings from the caregiver-implemented and direct language interventional studies reviewed above. The outcomes of these studies were diverse, ranging from an increase in the participants' initiation of conversational turns and responsiveness in conversations to the increased use of facilitative techniques and improved language measures (e.g., vocabulary, MLU and language scores on standardised tests). Although these intervention studies documented similarities in the changes shown by the caregivers and their children, they also acknowledged the individual variations that existed across their participants (e.g., Girolametto, 1988; Pennington, et al., 2009). Individual variation refers to the distributions of different components of responding among caregivers and their children (Bornstein, et al., 2008). It is claimed that these variations are typical in caregiver-child interactions (Huttenlocher, Vasilyeva, Waterfall, Vevea, & Hedges, 2007) and may be caused by several factors, such as the type of activity or routine and familiarity with the activity (Foster, 1986; Hoff, 2010; Klein, Moses, & Jean-Baptiste, 2010; Ryckebusch & Marcos, 2004; Spagnola & Fiese, 2007; Yoder & Davies, 1992; Yoder, Spruytenburg, Edwards, & Davies, 1995) and other caregiver and child factors e.g., personality, characteristics and social-economic status (Bornstein, et al., 2007; Drake, Humenick, Amankwaa, Younger, & Roux, 2007; P. Dunham & Dunham, 1992; Howard et al., 2011; Huttenlocher, et al., 2007; Pancsofar, Vernon-Feagans, Odom, & Roe, 2008; Rowe, 2008). The combination of these factors may contribute to variations in the changes shown by the caregivers following their participation in an intervention programme. Two caregivers who present with similar quantities of contingent responses may still vary (Huttenlocher, et al., 2007), for example, in whether they respond more to child vocalisation or child exploration, or whether they prefer the use of one type of facilitative technique over another type.

Although it is difficult to control for those factors, it does highlight the importance of examining variations in caregivers' conversational turns and facilitative techniques in improving children's overall conversational contingency following their participation in intervention programmes. For instance, a number of programmes have been shown to improve joint attention and/or initiation of conversational turns and responsiveness in conversations. Given that these skills have been identified as fundamental for achieving conversational contingency (Keenan & Schieffelin, 1976; Tomasello, 1988), these programmes are likely to result in increased conversational contingency across caregiver-child dyads. In addition, many of the programmes focus on improving facilitative techniques

which have been shown to extend children's topics which also results in improved contingency by the children.

1.6.2 Section summary

Intervention based on the social-interactionist theory emphasises conversation-based strategies that share the child's focus of attention, and utilises the child's natural environment (Norris & Hoffman, 1990b; Wilcox & Shannon, 1998). These intervention programmes include caregiver-implemented intervention programmes like the ITTT programme (Girolametto & Weitzman, 2006) and one-on-one teaching programmes like the RE/PMT (Fey, et al., 2006; Warren, et al., 2006) and EMT (Hancock & Kaiser, 2006) programmes. These intervention programmes have been reported to help caregivers to gain improvement in their use of joint engagement and facilitative techniques, and mediate their children's improvement in social-communication and language skills. However these programmes have not focused on the children's conversational contingency through caregivers' change in conversational turns and facilitative techniques.

1.7 Summary and thesis aims

This chapter has reviewed evidence from the literature that early caregiver-child conversations are essential for the development of conversational skills. Children's conversational skills such as the types of conversational turns that they produce, the quality of their turns and how they participate in conversations determine the quality of their interaction. The development of these skills is affected when a child presents with conversational difficulties. This may subsequently affect the quality of caregiver-child conversations, as caregivers may not know how they should fine-tune their language input to match their children's conversational deficits.

One approach to intervention for children with conversational difficulty is to provide educational training to caregivers so that they are able to provide an appropriate level of responsiveness and facilitation of conversational skills to their children, which then mediates the development of their children's conversational and other language skills. These intervention programmes are the product of social-interactionist and the transactional models

of development, which claim that caregivers' scaffolding behaviours affect their children's learning skills. The changes in their children's development then serve as feedback for their caregivers to continuously fine-tune their conversational turns to align with their children's capabilities.

Several intervention studies have indicated changes in children's conversational and language skills following such intervention programmes. These studies focused on investigating the (i) rates of caregivers' and children's bids to initiate conversations and responses to maintain conversations, and/or (ii) rates of caregivers' facilitative techniques in relation to children's language development. While the role of contingent turns have been highlighted in profiling children's conversational ability (e.g., Fey, 1986), more work needs to be done to address the impact of conversational turns and facilitative techniques to overall *conversational contingency*. It was argued that young children often fail to engage in conversations because they are unable to develop topics of conversation (K. Nelson & Gruendel, 1979). Data on caregivers and children's ability to maintain conversational contingency will provide information on their ability to build conversational topics across a sequence of conversational acts. This thesis aimed to address this issue through caregivers' use of conversational turns and facilitative techniques and children's production of conversational turns. Therefore the primary questions of this thesis are:

1. What is the impact of caregiver-training intervention programmes on caregivers' conversational topic turns [i.e., topic change (TC), topic extension (TE) and topic maintaining responses (TM)] and facilitative techniques (i.e., imitation, expansion, follow-in questions and follow-in cloze procedures)?
2. What is the impact of caregiver-training intervention programmes on children's conversational topic turns (i.e., TC, TE and TM)?
3. How do facilitative techniques (i.e., imitation, expansion, follow-in questions and follow-in cloze procedures) impact children's conversational skills? That is, does the use of facilitative techniques by caregivers in naturalistic environments result in higher rates and more complex use of child contingent topic turns (i.e., TE and TM), or does combining these techniques in a contrived setting enhance children's rates of contingent topic turns?

To address these questions, first of all, a standard methodology for recording the conversational samples, transcribing the conversational samples and coding of the transcripts was established. Two coding systems were developed for coding conversational topic turns and facilitative techniques. Subsequent to this, four studies were conducted.

Study 1 investigated the changes in caregiver-child conversations following a caregiver-implemented intervention programme i.e., It Takes Two to Talk® Hanen Program for parents (ITTT; Manolson, 1992; Pepper & Weitzman, 2004), and it addressed these research questions:

1. Does the *caregivers' use of conversational topic turns* change following intervention?
2. Does the *caregivers' use of facilitative techniques* change following intervention?
3. Does the *children's use of conversational topic turns* change following their caregivers' participation in intervention?
4. What are the *individual variations* among the participants of this study?

Study 2 investigated the changes in caregiver-child conversations following an individual caregiver training intervention programme i.e., Relating and Communicating programme (The Champion Centre, 2005). It was specifically designed for children ASD. This study addressed these research questions:

1. Does the *caregivers' use of conversational topic turns* change following intervention?
2. Does the *caregivers' use of facilitative techniques* change following intervention?
3. Does the *children's use of conversational topic turns* change following their caregivers' participation in intervention?
4. What are the *individual variations* among the participants of this study?

Study 3 investigated the qualitative change in two children's conversational turns, in relation to the activities they participated in. The following questions are addressed:

1. How do the children *collaborate* on an activity?
2. How do they *expand* an activity?

3. How do they *return* to a previously engaged activity?
4. How do they *propose* a new activity?

Finally, Study 4 is an experimental study that investigated effects of combining a facilitative technique (i.e., expansion) with wh-questions and with cloze procedures, on children's conversational turns. This study investigated whether expansion, when combined with either wh-questions or cloze procedures would result in:

1. *More topic extensions* than expansion alone?
2. *More verbal topic maintaining responses* than expansion alone?
3. *More non-verbal topic maintaining responses* than expansion alone?
4. *Fewer non-relevant responses* than expansion alone?

CHAPTER 2

METHODOLOGY

2.1 Introduction

In order to address the key questions stated in Chapter 1, it was essential to determine a coding system that was reliable and that would fit the purpose of the studies. As the research questions proposed in this thesis are focussed specifically on caregiver topics and facilitative techniques, and their impact on children's topic contingency, it was critical to have a system that clearly defined methods for coding topics and facilitative techniques. The aim of this chapter is to describe the coding systems used in the studies of this thesis. In the first instance, the data transcription method and its reliability will be described. This will be followed by a detailed description of topic coding and facilitative techniques. Finally, the reliability of the coding system will be noted. Although specific information regarding data collection, transcription, and coding will be provided with each specific study, this chapter provides a general overview of the coding methods used in this thesis.

2.2 Data transcription

2.2.1 Transcription protocol

In order to have accurate coding of topics and utterances, a reliable transcription method was required. For this thesis, conversation samples were transcribed by the investigator using Transana 2.3 (Woods & Fassnacht, 2008), a software package that permits transcription of digital video data. This was appropriate as all caregiver-child interactions were audio and videotaped (details can be found within each chapter describing specific studies). Transcription and formatting was done with Codes for the Human Analysis of Transcripts system (CHAT). CHAT is the standard transcription system of the Child Language Data Exchange System (CHILDES; MacWhinney, 2000). CHILDES contains programmes that can be used to track a variety of language structures in naturally occurring data. It has been used extensively in studies on child language (e.g., Goodman, Dale, & Li,

2008; Trautman & Rollins, 2006). Appendix B summarises all the CHAT conventions used in this study.

The transcripts were coded using the systems described below. Using the CHAT format, the codes were entered in specially labelled tiers in the transcripts. In the %spa tier shown in Example 2.1, the speaker is identified by the $ symbol (i.e., $CHI for child or $MOT for mother) and this is then followed by the codes of the conversational act. While the raw data include all the codes, the codes have been removed from many of the excerpts in this and subsequent chapters to facilitate comprehension of the conversational exchanges, unless needed for the argument being made. An excerpt containing the actual CHAT conventions is presented in Appendix C.

Example 2.1 (Source: thesis data)

1	Child	:	gaegi@p [: daddy] book.
	%spa	:	$CHI:TC
2	Caregiver	:	daddy read a book.
	%spa	:	$MOT:TM
3	Child	:	ok.
	%spa	:	$CHI:TM

2.2.2 Reliability of transcripts

The reliability of the transcripts was established to verify (i) the adherence of the transcripts to the CHAT conventions, and (ii) the content of the transcripts.

Adherence of the transcripts to the CHAT conventions was done using the automatic facilities of the CHILDES system. The software detects errors in the use of CHAT conventions. These errors were corrected before the content of the transcripts was verified.

Reliability of the content of transcripts was established by using a method adopted by Girolametto et al. (2007) and Johnston (2001). 69.35% of the total transcripts from Studies 1 and 2 were verified by two independent raters. The first was an undergraduate speech-language therapy student and the second was a qualified speech-language therapist with a masters degree in speech-language therapy. The raters went through the transcripts while watching the videos using the Transana 2.3 software. Any disagreements were noted on the transcripts and resolved through discussions with the investigator. Amendments were then made on the transcripts. Consensus reliability was conducted on those transcripts before they were amended, using the formula: number of agreements/(the number of agreements +

disagreements) X 100. Consensus reliability for transcription of the adult utterances was 97.93 (*N*=13,645) and child utterances was 99.49% (*N*=9819). The final reliability results indicate high reliability of data transcription.

2.3 Coding System

In order to answer the questions addressed by this thesis, a reliable coding system was required to address two key aspects of the child-caregiver conversations: (i) Coding of conversation (topic coding and conversational topic turns); and (ii) Coding of facilitative techniques. The coding decisions for this thesis were derived from a number of coding systems (Bellon-Harn, et al., 2004; Bradshaw, et al., 1998; Brinton & Fujiki, 1984; Fey, 1986; Girolametto, 1988; Girolametto, et al., 1999; Keenan & Schieffelin, 1976; J. E. Roberts, Martin, et al., 2007; J. E. Roberts et al., 1989; Tannock, 1988; Yoder, Davies, et al., 1994) and were created against a framework of Conversation Analysis (CA; Sacks, et al., 1974; Schegloff, 1996) and Relevance Theory (RT; Sperber & Wilson, 1995).

2.3.1 Conversational Codes

Two key conversational codes were utilised in this study: (i) topic coding and (ii) identification of conversational topic turns. Prior to assigning those codes however, all child and caregiver behaviours were classified as either communicative or non-communicative acts. An act was considered communicative when it was directed to the conversational partner, whether or not that partner responded. Non-communicative acts were those that were not directed at the conversational partner and included momentary self-talk or a momentary distraction from the topic at hand caused by something going on in the environment (J. E. Roberts, Martin, et al., 2007), or indicators of a non-response (e.g., appearing disengaged from the interaction, manipulating an item on his or her own).

All communicative acts were then determined to be either verbal or non-verbal. A verbal act was an utterance made up of words, word approximations, vocalisations and onomatopoeia sounds. Utterance boundaries were based primarily on intonation contour (Rollins, 2003) and secondarily, on pause duration of 1 second or more (Girolametto, 1988). According to Jefferson (1989), a pause of more than 1 second in producing the next utterance

is noticeable as a delay to the listener. Non-verbal communicative acts were those where the child or adult's contribution to the interaction was a sign, conventional gesture (e.g., pointing, showing, nodding, smiling), responsive eye-gaze at the speaker (including confused gazing), eye-gaze to the speaker's focus of attention, or crying or pushing to indicate protest (Girolametto, 1988; Girolametto, et al., 2007).

The following excerpts demonstrate the distinction between communicative and non-communicative acts, and between verbal and non-verbal acts. In Example 2.2, both turns are considered communicative because they were directed to their conversational partner. In line 1, the child verbally requested an action from the caregiver, and in line 2, the caregiver responded by complying with a non-verbal communicative act.

Example 2.2 (Source: thesis data)

1	Child:	mummy stop.	*(verbal communicative act)*
2	Caregiver:	0 [^ stops and turns her gaze at child].	*(non-verbal communicative act)*

In Example 2.3, the child's non-verbal act (line 2) following the caregiver's act was non-communicative because it was not directed at the caregiver.

Example 2.3 (Source: thesis data)

1	Caregiver:	something else?	*(verbal communicative act)*
2	Child:	0 [^ stares at the front].	*(non-verbal non-communicative act)*

In Example 2.4, the caregiver's utterance (line 2) is non-communicative because it is a momentary off-topic self-talk caused by an unexpected environmental distraction (i.e., a toy in the jug). She returns to the conversational topic immediately (line 3) after the distraction has been removed.

Example 2.4 (Source: thesis data)

1	Caregiver:	the milk jug?	*(verbal communicative act)*
2	Caregiver:	we'll take this thing out [= whispers as she removes a piece of toy from the jug].	*(verbal non-communicative act)*
3	Caregiver:	there we go.	*(verbal communicative act)*
4	Caregiver:	oh the milk fell over.	*(verbal communicative act)*

Acts that were unintelligible despite multiple attempts at transcription by the main transcriber (i.e., investigator) and two other transcribers were regarded as "uncodable" and eliminated from further analysis.

Conversational Codes: Topic Coding

Once all communicative acts were identified and classified, the next step of the coding that was applied to the caregiver and child's conversational acts was topic coding. As noted in the literature review, topic, according to Keenan & Schieffelin (1976, p. 338) is "a proposition (or set of propositions) expressing a concern (or set of concerns) the speaker is addressing". In order to determine "topic", a set of contextual cues adapted from Brinton & Fujiki (1984) and Roberts and colleagues (2007; 1989) were applied. These included: propositional content, grammatical form, physical context, social context, and linguistic context. In the example below (Example 2.5), the dyad's conversational excerpt consists of two topics. They are playing with a doll and are talking about "putting the doll in bed" (line 1 to 4). Then, the caregiver talks about "wrapping the doll up" in line 5.

Example 2.5 (Source: thesis data)

1	Caregiver:	we gonna put her in her bed?	***(Topic: Put doll in bed)***
2	Child:	yeah.	
3	Child:	0 [^ puts the doll on the cloth]!	
4	Child:	that better.	
5	Caregiver:	oh are you gonna wrap her up so she's nice and warm?	***(Topic: Wrapping the doll up)***

Conversational Codes: Assignment of Conversational Topic Turns

The second type of conversational coding that was applied to the caregiver and child's conversational acts was conversational *topic turns*. For the purposes of this thesis, the definition of a topic turn followed the definition of a *speaker turn* used by Roberts and colleagues (2007; 1989). A topic turn was defined as an utterance, string of utterances and/or non-verbal communicative acts expressed by a speaker that share the same topic. A topic turn

commenced when a speaker produced an act (verbal or nonverbal) and concluded when there was a change of topic or when another speaker took the conversational floor.

When a topic turn consists of a combination of verbal and non-verbal acts, it is coded as a verbal topic turn. This is shown in Example 2.6. The caregiver's topic turn consists of a question (line 1) and a non-verbal cue (line 2) to prompt for an answer from the child. This is coded as a verbal topic turn. Similarly, in Example 2.7, the caregiver's topic turn is coded as a verbal topic turn because it consists of a non-verbal act (line 2) and verbal act (line 3).

Example 2.6 (Source: thesis data)

1	Caregiver:	ok, what else are you buying?	} Coded as a verbal topic turn
2	Caregiver:	0 [^ shows child a picture of a pudding].	
3	Child:	pudding!	

Example 2.7 (Source: thesis data)

1	Child:	ahahahahchoo [^ pretends to sneeze].	
2	Caregiver:	0 [^ pretends to sneeze].	} Coded as a verbal topic turn
3	Caregiver:	ahahahchoo [^ pretends to sneeze again].	

The example below illustrates the assignment of topic turns. Using Example 2.5 again, the caregiver's first topic turn is made up of one conversational act (verbal). The child's topic topic turn however is made up of three conversational acts, two which are verbal and one which is non-verbal. In the next example (Example 2.8), a caregiver and child are talking about a man cooking on a barbeque. Although the child produces consecutive utterances (line 5 and line 6), the utterances are coded as two topic turns because the topic changes part way through.

Example 2.8 (Source: thesis data)

1	Caregiver:	what's he cooking on [^ points at the picture]?	***(Topic: A man is cooking)***
2	Caregiver:	what's that?	
3	Child:	on the pot.	
4	Caregiver:	it's a barbeque.	
5	Child:	barbeque.	
6	Child :	what this [^ points at a new picture]?	***(Topic: A new picture)***
7	Child:	look.	

Once topics and verbal topic turns were identified, each verbal topic turn was given a label which identified the role it contributed to the overall conversation. These labels were:

topic change (TC), *topic extension* (TE), and *topic maintaining response* (TM). These topic turn labels were adapted from topic coding systems described by several researchers (Brinton & Fujiki, 1984; Fey, 1986; Girolametto, 1988; Keenan & Schieffelin, 1976; J. E. Roberts, Martin, et al., 2007; J. E. Roberts, et al., 1989; Tannock, 1988). This topic coding system was determined to be an effective way to code conversations given its utility in comparable studies.

Topic change (TC)

Conversational topics are introduced by topic changes (TCs). A TC is an act whose *lack of contingency* to the preceding act means it is not related to the preceding act. For the purposes of this thesis, TCs are defined in two ways. First, a TC can be an act that initiates a new topic that has not been introduced anywhere before or is being reintroduced after a hiatus in which the question of immediate concern is elsewhere. TCs are therefore attempts to switch the central concern of the preceding topic to a new one (Girolametto, 1988; Tannock, 1988). Criteria used for determining TCs of this kind are similar to those used by Brinton & Fujiki (1984), Keenan & Schieffelin (1976, referred to as topic discontinuations), and Girolametto (1988, referred to as redirect turns).

The second kind of TC employed here is one in which the preceding topic has been shifted tangentially. In the literature, a tangential shift has been defined as an utterance that (i) includes some aspect of the propositional content of the preceding act but (ii) tangentially shifts the topic focus of the preceding act to a new one, and (iii) does not seem to extend the topic in an adequate manner (Brinton & Fujiki, 1984; Fey, 1986; Letts & Reid, 1994). While tangential extensions have been coded separately in the studies mentioned above, for the purposes of this thesis, tangential extensions are coded as TCs because they *lack contingency* with their preceding acts or topics. Examples of TCs and how they change conversational topics are presented and described as follows.

The first example (Example 2.9) is taken from Girolametto (1988, p. 53) . In this example, the caregiver employed a TC by changing the child's focus of attention from "truck" (line 1) to "baby's hat" (line 2).

Example from 2.9 (Source: Girolametto, 1988, p. 53)

1	Child:	(pushes the truck)
2	Mother:	where's the baby's hat?

The next example is taken from Brinton & Fujiki (1984, p. 353) and it illustrates a more tangential shift to a new topic. In Example 2.10, the first topic that speaker 1 and speaker 2 talk is about "bracelet" (line 1 and 2). However, speaker 3 shifts the topic of speaker 2's verbal act to "aunt's baby". This new topic is non-contingent with the preceding topic. Therefore, it changes the preceding topic to a new one.

Example 2.10 (Source: Brinton & Fujiki, 1984, p. 353)

1	Speaker 1:	this is a neat bracelet.	***(Topic: Bracelet)***
2	Speaker 2:	my aunt gave it to me for my birthday.	
3	Speaker 3:	my aunt had a baby.	***(Topic shifted to: Aunt's baby)***

Moving to examples that are taken from the data collected for this thesis: Example 2.11 shows a TC because the dyad move from talking about "Kerry, the cat" (line 1 to 4), to "peeling the mandarin" (line 5 to 6). Because the child's act in line 5 exhibits a noticeable absence of contingent response to the caregiver's question in line 4, the child's verbal act in line 5 is coded as a TC.

Example 2.11 (Source: thesis data)

1	Child:	Kerry rat [: scratched] Billy back.	***(Topic: Kerry, the cat)***
2	Caregiver:	Kerry scratched his back?	
3	Child:	yeah.	
4	Caregiver:	how come?	
5	Child:	xxx all by myself [^ peels a mandarin].	***(Topic changes to: Peeling the mandarin)***
6	Caregiver:	you're peeling it by yourself.	

In the next example (Example 2.12), the first topic is initiated by the caregiver and it is about "sugar for Cissy" (line 2). The child produces an act that concerns "Cissy" but does not provide the caregiver with information that is relevant to the caregiver's request. Even though line 2 contains a word that is also contained in the caregiver's preceding act (i.e.,

Cissy), there is a non-contingency and a shift in the question of immediate concern between line 1 and 2. Therefore, the child's act in line 2 is a TC.

Example 2.12 (Source: thesis data)

1	Caregiver:	does Cissy want sugar?	***(Topic: Putting sugar in their tea)***
2	Child:	Cissy sitting down.	***(Topic tangentially shifted to: Cissy is sitting down)***

Topic extension (TE)

Unlike a TC which changes or shifts a topic through the production of a non-contingent topic turn, a topic extension (TE) is an act that is contingent but nonetheless shifts the focus of attention. In the literature this has sometimes been called a shift to a sub-topic (Hobbs, 1990; Reichman, 1990). A TE shares some aspect of the propositional content of the preceding act but contains new information that *contingently* shades the focus of attention of the preceding act to a different but related focus of attention. TEs therefore help the conversation to contingently and sequentially move from one focus of attention to another. They do not end the preceding focus of attention but rather build it into a larger framework of topics that are relevantly linked to each other.

To demonstrate TE, excerpts from this thesis's conversational data are used. In Example 2.13, the caregiver and her child are pretending to have a tea party. The conversational topic from line 1 to 3 is about "the tea is too hot". After that, while still engaging in the same activity and focusing on "tea", the caregiver extends the focus of their conversational topic to "pouring the tea out". This act (line 4) is a TE because it extends the preceding topic to a new focus of attention that is still contingent with "tea". Line 4 does not end the focus of the preceding topic entirely, but shades it to an act that "seems to be the next appropriate step" when "holding a teapot of hot tea".

Example 2.13 (Source: thesis data)

1	Child:	cup of tea is not [: hot] tea too not [: hot].	***(Topic: The tea is too hot)***
2	Caregiver:	yeah I think it's hot.	
3	Caregiver:	[^ touches the teapot] ooh it is quite hot!	
4	Caregiver:	would you like to pour the tea?	***(Topic shaded to: Pouring the tea)***

Referring back to Example 2.5, repeated here for convenience, while the caregiver and child are engaged in a "doll play", the focus of the topic is extended from "putting the doll in bed" (line 1 to 4) to "wrapping the doll up" (line 5). This new focus of attention was introduced by the caregiver, an act that prompts her child to make an action to expand their preceding topic while relevantly bridging the preceding act with the new focus of attention.

Example 2.5 (Source: thesis data)

1	Caregiver:	we gonna put her in her bed?	***(Topic: Put doll in bed)***
2	Child:	yeah.	
3	Child:	0 [^ puts the doll on the cloth] !	
4	Child:	that better.	
5	Caregiver:	oh are you gonna wrap her up so she's nice and warm?	***(Topic shaded to: Wrapping the doll up)***

Topic maintaining responses (TM)

A topic maintaining response (TM) is an act that continues the current topic contingently. Using examples from the data of this thesis, Example 2.14 shows a "yes" response (line 2) from the child; Example 2.15 shows how the child's verbal act fulfils the preceding acts' obligation without changing or shading the topic (line 2); Example 2.16 shows an imitation of the preceding utterance (line 2); and Example 2.17, the caregiver's verbal act (line 2) is a feedback that is semantically relevant to the child's the preceding verbal act. Therefore, these responses are coded as TM.

Examiner 2.14 (Source: thesis data)

1	Caregiver:	up here &=gest:couch ?
2	Child:	yeah.

Example 2.15 (Source: thesis data)

1	Caregiver:	what do you think he is doing?
2	Child:	there, went up.

Example 2.16 (Source: thesis data)

1	Child:	ohdei@c [: all day].
2	Caregiver:	all day?

Example 2.17 (Source: thesis data)

1	Child:	cow.
2	Caregiver:	good.

Non-relevant response (NR)

A non-relevant response NR is coded when there is a period of 1 second or more during which a topic turn might have occurred following a topic turn that solicits a response, but did not. NRs are shown in Example 2.18 (line 2) and Example 2.19 (line 2). In both examples, the caregivers' acts were not responded by the children and the children's acts are identified as non-communicative. Thus, a NR (line 2) is coded in these two examples.

Example 2.18 (Source: Girolametto, 1988, p. 53)

1	Caregiver:	where's dolly?
2	Child:	(continues to look at mother). *(No response)*

Example 2.19 (Source: thesis data)

1	Caregiver:	and then who would like gherkin?
2	Child:	0 [^ rummages the toys in a bag]. (*Non-communicative*)

Summary of the conversational coding system

The coding system identified conversational topics and marked each communicative act in the transcript with a code. A string of acts produced by the same speaker when the speaker takes the conversational floor can be grouped into one or more *topic turns*. A topic turn consists of acts that share the same conversational topic. Therefore, a topic turn ends (i) when another speaker takes the conversational floor or (ii) when a new conversational topic is introduced by the same speaker.

To specifically identify the type of topic turns, each act is coded for their role in the conversational topic. A topic change (TC) lacks contingency with the preceding act and changes the conversational topic by (i) introducing or reintroducing a new topic that has not been introduced anywhere before the act that introduces it, or (ii) shifting the preceding topic tangentially to a new topic. By contrast, a topic extension (TE) extends the preceding topic by sharing some semantic aspects of the preceding verbal act or topic, but adds new semantic details to the topic thus shading the central concern contingently to a new central concern. Communicative acts that share the same conversational topic as a TC and TE are coded as

topic maintaining responses (TMs). When a speaker produces an act that solicits a response such as a question, and the other speaker does not produce a response, a non-relevant response (NR) is coded. Figure 2.1 shows the methodology described as depicted in a flow chart.

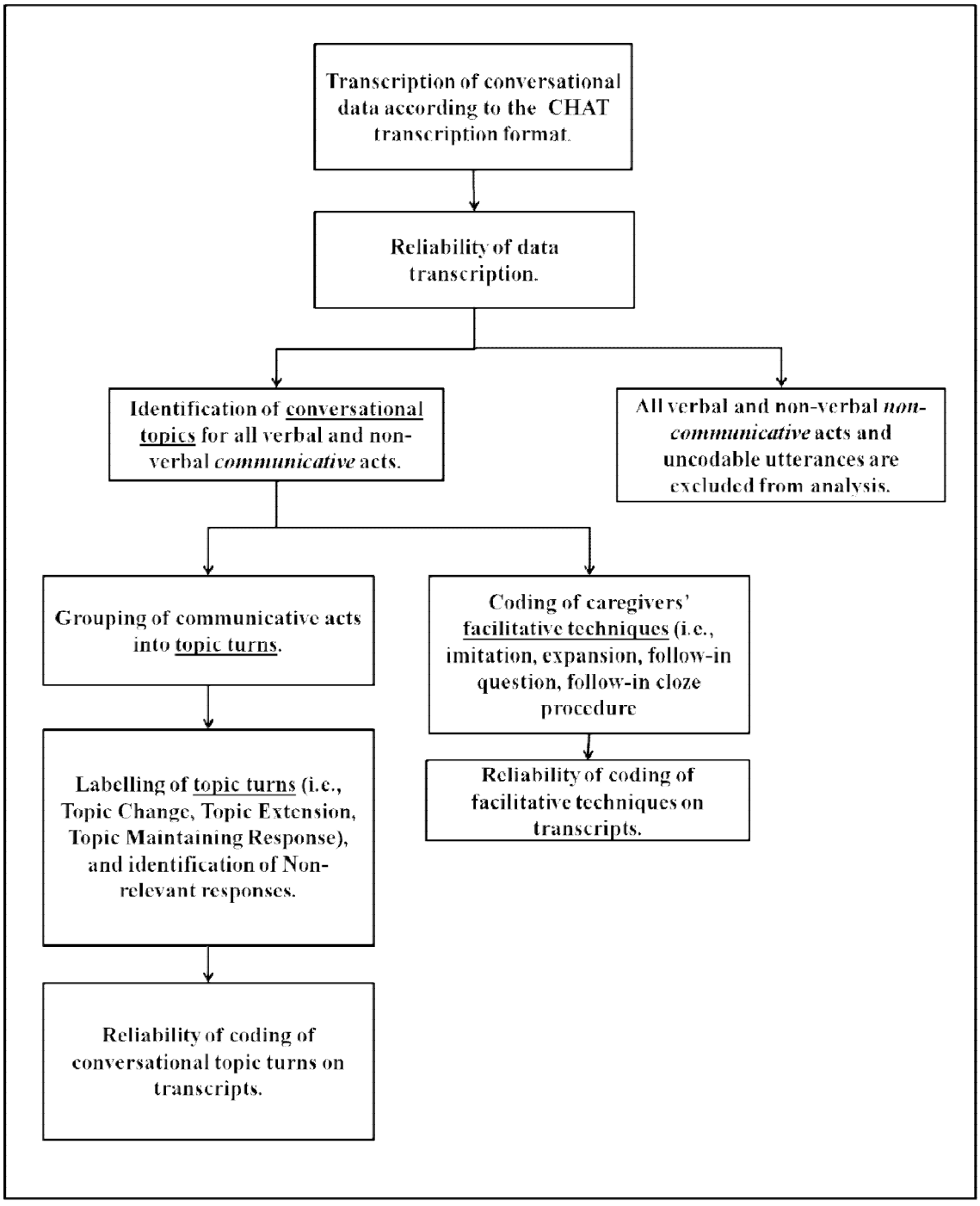

Figure 2.1 Flow of methodology for data transcription and coding

2.3.2 Facilitative techniques

The previous section described the coding system used to code the conversational behaviours of children and adults in the observational transcripts. The current section describes the codes used to categorise the facilitative techniques used by the caregivers and speech-language therapists (SLTs) who participated in the studies of this thesis. These codes were based on those described by Girolametto, Weitzman, Wiigs, & Pearce (1999), Bellon-Harn, Hoffman, & Harn (2004), and Yoder et al. (1994). Four techniques were coded on the caregiver's contingent verbal acts. They were *imitation, expansion, follow-in questions, and follow-in cloze procedure*. As noted in the literature review, imitations and expansions are follow-in comments that do not obligate a response from the child whereas follow-in wh-questions and follow-in cloze procedures are follow-in directives that obligate responses from the child (McCarthren, et al., 1995; McDuffie & Yoder, 2010; Yoder, Davies, et al., 1994; Yoder, et al., 1998). Follow-in directives also function as prompts for the child to respond. The following section describes these facilitative techniques in detail.

Imitation

Imitation is an immediate repetition of the child's preceding complete or partial verbal act without adding any linguistic unit (Girolametto, et al., 1999). From Girolametto et al.'s (1999) example (Example 2.20), the caregiver partially imitates the child's preceding utterance.

Example 2.20 (Source: Girolametto, et al., 1999, p. 374)

1	Child:	Boy has a hat.
2	Mother:	A hat. *(Imitation)*

Using examples from the thesis data, partial imitation is shown in Example 2.21, and complete imitation is shown in Example 2.22.

Example 2.21 (Source: thesis data)

1	Child:	I want, I want to do dishes.
2	Caregiver:	dishes? (*Imitation*)

Example 2.22 (Source: thesis data)

1	Child:	spoons.
2	Caregiver:	spoons. (*Imitation*)

Expansion

Expansion is an immediate repetition of the child's preceding word, word approximation, vocalisation, or completion of the child's preceding utterance by the addition of one or more morphemes or semantic information (Girolametto, et al., 1999). In this thesis, reformulation of a verbal act with additional semantic or syntactic units is included in expansion. The expansions coded here differ from conversational recasting in that they did not contain any predetermined grammatical target syntactic structures (Camarata & Nelson, 2006; Hassink & Leonard, 2010). The selection of information to build on the child's verbal act was spontaneous and based on the conversational context.

In Example 2.23 (from Girolametto, et al., 1999), the caregiver expands the child's verbal act with plural –s (line 2), by adding 'two' and plural –s (line 4) and by using a tag question (line 6).

Example 2.23 (Source: Girolametto, et al., 1999, p. 374)

1	Child:	Hat.
2	Mother:	Hats. ***(Expansion)***
3	Child:	Hat.
4	Mother:	Two hats. ***(Expansion)***
5	Child:	Hat.
6	Mother:	You have a hat like that, don't you? ***(Expansion)***

In Example 2.24, the caregiver adds an adjective to describe the child's preceding noun.

Example 2.24 (Source: thesis data)

1	Child:	delicious.
2	Caregiver:	delicious pear. (***Expansion***)

Follow-in questions

Follow-in questions are wh-questions that maintain or extend the topic of the preceding act (Yoder, Davies, et al., 1994) and do not change the topic completely or tangentially. In Example 2.25 (from Yoder, Davies, et al., 1994) the caregiver uses "what" questions to prompt the child to provide more information on each of the child's verbal act (line 3 and 4) and to request for clarification (line 6).

Example 2.25 (Source: Yoder, Davies, et al., 1994, p. 204)

1	Child:	dinner.
2	Mother:	what do you want for dinner? *(Follow-in question)*
3	Child:	eat.
4	Mother:	what do you want to eat for dinner? *(Follow-in question)*
5	Child:	X.
6	Mother:	what? *(Follow-in question)*

In Example 2.26 (from this thesis's data), "what" questions are used to help the child to extend the conversational topic from "mummy will come to the city" to "things to do in the city" (line 4). Then the caregiver extends the conversational topic by shading it to "things that they could do in the city" by producing a "what" question that is relevant to the previous topic.

Example 2.26 (Source: thesis data)

1	Child:	mummy will come.	***(Topic: Mummy will come the city)***
2	Caregiver:	oh I can come?	
	Child:	0 [^ nods].	
3	Caregiver:	I would like to come.	
4	Caregiver:	what should we do in the city? (*Follow-in question*)	***(Topic shaded to: Things to do in the city)***
5	Child:	we'll go to Coffee Culture.	

Follow-in cloze procedure

A follow-in cloze procedure is similar to "filling in the blanks" and it enables both individuals to share the expression of the message. The speaker pauses at appropriate junctures so that the listener can supply the needed information (Bellon-Harn, et al., 2004; Bradshaw, et al., 1998). Similar to follow-in questions, only cloze procedures that function as follow-in directives are coded. They should either maintain or contingently extend the conversational topic and not change the topic completely or tangentially. In Example 2.27 the mother uses a follow-in cloze procedure to prompt the child to provide more information on the child's previous verbal act.

Example 2.27 *(Source: thesis data)*

1	Child:	mm I draw [^ picks up the pen].
2	Caregiver:	gonna draw +..? (*Follow-in cloze procedure*)
3	Child:	baby.

Summary of the facilitative technique coding system

The coding system for caregiver/therapist facilitative techniques included four codes: imitation, expansion, follow-in questions and follow-in cloze procedure. Imitation was coded when the caregiver produced a partial or a complete repetition of the child's preceding act or topic turn without the addition of any linguistic unit. Expansion was coded when the caregiver produced a partial or complete repetition of the child's preceding act or topic turn, with the addition of one or more new morphemes. Follow-in questions were wh-questions that contingently extended the conversational topic or that maintained the conversational topic. Follow-in cloze procedures were incomplete verbal acts with a significant pause at the end so that it obligated the child to finish the utterance. Follow-in cloze procedures were coded only when they contingently extended or maintained the conversational topic.

2.3.3 Reliability of conversational topic turn coding

Reliability of the conversation codes was established to verify (i) the adherence of the format of the coding systems, (ii) inter-rater reliability of the conversational codes, and (iii) inter-rater reliability of the facilitative technique codes.

Adherence to the format of conversational acts and facilitative techniques was accomplished with a custom programme that was designed to detect errors in the coding format of the conversational acts. This programme detected error in code tagging i.e., when a child act was coded as a caregiver act or when the first topic turn of a conversational section is coded as a topic maintaining response instead of an initiation or an extension. All errors detected by the programme were corrected before reliability of the codes was computed.

As the coding system for conversational topic turns consisted of a list of extensive matrices, reliability was established in three stages, to assist with the development of this coding system. The first stage was conducted on two transcripts only to ensure that these categories were reliable before some of them were further coded on all transcripts. This initial reliability was performed by a rater who has extensive knowledge and research experience in linguistics. The rater coded a 20 minute language sample from the data of this thesis. Reliability was established using this formula: number of agreements/(the number of agreements + disagreements) X 100. The agreement rate for the caregiver's conversational topic turns was 83.87% (N=434), and the agreement rate for the child's conversational topic

turns was 83.14% (*N*=255). Because the agreement for the first sample was lower than 85%, disagreements were resolved through consensus discussions by viewing the language sample with the investigator. Changes were then made to refine the definition of the codes. After that, another 20 minute language sample was coded. Inter-rater reliability for the caregiver's conversational topic turns was 91.99% (*N*=387), and for the child's conversational topic turns was 89.23% (*N*=260). As the second reliability rate was higher than 85%, no further consensus discussion was needed.

The second stage involved methodology utilised by Girolametto et al. (2007) and Johnston (2001). In this method, 19 out of 62 coded transcripts (i.e., 30.65%) from Studies 1 (Chapter 3) and 2 (Chapter 4) were randomly selected and verified. The coder who verified the transcripts had ten years of clinical experience in speech-language therapy and was a doctoral student in speech-language therapy. The coder verified the codes marked by the investigator by reading the transcripts and watching the videos, and noted the disagreements. Consensus reliability was conducted on the transcripts before they were amended, using the formula: number of agreements/ (the number of agreements + disagreements) X 100. Consensus reliability for coding of the caregiver acts was 98.99% (*N*=5561) and child acts was 99.24% (*N*=4736).

In the third stage of reliability establishment, the same coder independently recoded 6 randomly selected transcripts out of the remaining transcripts (i.e., 10%) from Studies 1 and 2. Inter-coder reliability agreement of the caregiver acts was 85.12% (*N*=1223) and child acts was 90.19% (*N*=877).

High inter-rater agreement was obtained when the codes were verified from the transcripts and when the transcripts were independently coded by the second coder. High reliability indicates reproducibility of the coding systems and enables valid findings to be drawn from the data (Portney & Watkins, 2000).

2.3.4 Reliability of caregivers' facilitative techniques coding system

Reliability of the coding of caregivers' facilitative techniques was also achieved in two stages. The first stage involved methods utilised by Girolametto et al. (2007) and Johnston (2001). The same 30.65% coded transcripts that were verified for conversational acts were verified for facilitative techniques. The same coder read the coded transcripts and

noted disagreements. Consensus reliability was conducted on the transcripts before they were amended, using the same formula: number of agreements/ (the number of agreements + disagreements) X 100. Consensus reliability for coding of the caregivers' imitations was 98.24% (*N*=511), caregivers' expansions was 89.29% (*N*=308), caregivers' follow-in questions was 82.58% (*N*=287), and caregivers' follow-in cloze procedures was 96.04% (*N*=202).

In the third stage of reliability establishment, the second coder independently recoded 10% of the same transcripts that were randomly selected for independent coding of the conversational acts. Inter-coder reliability agreement of the caregivers' imitations was 98.25% (*N*=57), caregivers' expansions was 98.95% (*N*=95), caregivers' follow-in questions was 98.72% (*N*=78), and caregivers' follow-in cloze procedures was 100.00% (*N*=10).

2.4 Conclusion

This chapter describes the coding system used for this thesis. Coding decisions were determined based on previous literature. The reliability of the coding system was confirmed using methods described in previous research. In the following chapters, specific studies that employed this coding methodology are described.

CHAPTER 3

STUDY 1

CHANGES IN CAREGIVER-CHILD CONVERSATIONAL SKILLS FOLLOWING A CAREGIVER-IMPLEMENTED INTERVENTION PROGRAMME: SINGLE SUBJECT DESIGN

3.1 Introduction

Early caregiver-child interactions that scaffold children's language skills are those that are responsive and contingent with children's conversational turns (Brady, et al., 2009; Girolametto, et al., 1999; McDuffie & Yoder, 2010; Rocissano & Yatchmink, 1984; Rollins, 2003). Such interactions can be delivered via contingent topic turns (e.g., topic extension and topic maintaining responses) and language facilitative techniques (e.g., imitation, expansion, follow-in questions and follow-in cloze procedure). Hypothetically, contingent topic turns and facilitative techniques reduce cognitive load for the listener, allowing learning to take place (McCarthren, et al., 1995; K. E. Nelson, 1989; Tomasello, 1988). Essentially, children's language output in the form of utterances that initiate, extend, and respond to topics then stimulates more language input from their caregivers and this cycle promotes continuous language (Baldwin & Meyer, 2008; Bohannon & Bonvillian, 2009; K. E. Nelson, 1989), cognitive (Beckwith & Parmelee, 1986; Landry, et al., 2001) and social-emotional (Black & Logan, 1995; Greenspan & Shanker, 2007; Raver, 1996; Thompson, 2006) development. Advancement of these skills may help the child to code the world of people and things more effectively and eventually enter social-relationships more easily.

Lack of active participation in conversations has been documented in children with conversational difficulties. For instance, a high level of assertiveness but low level of responsiveness is frequently reported in children with autism spectrum disorders (ASD; Hale & Tager-Flusberg, 2005; Philofsky, et al., 2007; J. E. Roberts, Martin, et al., 2007). Conversely, adequate responsiveness but low assertiveness in conversations has been reported in children with Down syndrome (J. E. Roberts, Martin, et al., 2007; Tannock, 1988), specific language impairment (SLI; Brinton, et al., 1998; Liiva & Cleave, 2005), and

children with cerebral palsy with poor speech intelligibility (Pennington & McConachie, 2001a, 2001b).

In implementing intervention to improve children's conversational skills, and specifically their ability to be contingent, it is important that caregivers' conversation skills are targeted as agents to improve their children's level of assertiveness and responsiveness. One way to do so is by training caregivers to change their conversational skills, to suit their children's language complexity and developmental needs. The It Takes Two to Talk® Hanen Program for parents (ITTT; Manolson, 1992; Pepper & Weitzman, 2004) is one such intervention programme. It involves group training for caregivers, tailored intervention goals for each child, and social support for the family of that child (Girolametto & Weitzman, 2006). Each group session includes a combination of interactive presentation, group discussion, videotape analysis, and opportunities to practise the skills taught. Caregivers are taught to use language facilitation techniques (e.g., waiting, imitation, expansion, and questions) and to select specific communication goals with their clinician, in group sessions. During the course of the intervention, a speech-language therapist (SLT) visits each family three times, at their home, and conducts videotaping of the interaction between the caregivers and their children. The videotapes are reviewed and feedback about the interaction is provided to the caregivers. Intervention efficacy of the ITTT programme has been reported as positive in the literature. It was reported that caregivers initiate topics less frequently and maintain conversational topics more often (Girolametto, 1988; Pennington, et al., 2009; Tannock, et al., 1992). Simultaneously, their children increased their participation in conversations with higher levels of assertiveness and responsiveness. Other benefits reported from the ITTT programme includes improvement in joint attention between caregiver-child dyads (Girolametto, et al., 1994), the use of less complex turn structures by the caregivers and vocabulary improvement by the children (Girolametto, et al., 1996). Similar findings and development in aspects of language were also found in other intervention programmes that involve caregiver training (Aldred, et al., 2004; Arnold, Lonigan, Whitehurst, & Epstein, 1994; Dale, et al., 1996; Girolametto, et al., 2007; Hancock, et al., 2002).

Most caregiver-implemented interventional studies that looked at children's social interaction skills focus on the development of their bids for initiation in social interaction and responsiveness to others' conversational bids (Girolametto, 1988; Girolametto, et al., 2007; Pennington, et al., 2009; Rocissano & Yatchmink, 1984; Tannock, 1988; Wetherby, et al., 1988; Yoder, et al., 2001). While these turns do reflect an increase in active participation in

conversations, they do not specifically reflect changes in the construction of conversational topics with their caregivers and the contingency of those utterances. Nelson and Gruendel (1979) claimed that knowledge in both conversational turn-taking and conversational contingency through conversational topics is important for successful turn collaboration in conversations. Contingent turns in conversations can be organised into topics (Stech, 1982) and this is one possibility for investigating coherence in conversations (Schegloff, 1990). As change in conversational topics are common in typical conversations, frequent topic changes may reflect disruptions in the conversational flow instead of an expansion of the conversational flow. It was argued that young children often fail to engage in real conversations because they are unable to develop topics of conversation (K. Nelson & Gruendel, 1979). To date, there is limited data on the reciprocal changes in topic changes (TCs), topic extensions (TEs), and topic maintaining responses (TMs) in caregiver-child conversations, and scaffolding of these topic turns via caregivers' facilitative techniques, following the caregivers' participation in a caregiver-implemented intervention programme.

Therefore, this study aimed to document the changes towards achieving contingency in conversational topic turns through conversational topics and facilitative techniques, in caregivers and children's conversational topic turns following the ITTT programme. A single subject design was used in this study because it allowed for examination of characteristics of individuals who responded to intervention and those who did not (Portney & Watkins, 2000) and observation of individual variations among participants.

This study involved four caregiver-child days, and specifically asked the following questions: (i) "Does the caregivers' use of conversational topic turns change following intervention?" (ii) "Does the caregivers' use of facilitative techniques change following intervention?" (iii) "Does the children's use of conversational topic turns change following their caregivers' participation in intervention?" and (iv) "What are the individual variations among the participants of this study?"

3.2 Method

3.2.1 Research design

This study employed a single subject design across participants to investigate the conversational contingency of caregivers and their children following the caregivers' participation in the ITTT programme. In order to measure change, eight repeated measurements were taken across three phases: (i) three in the baseline phase, (ii) three in the intervention phase, and (iii) two in the follow-up phase.

3.2.2 Participants

Participants were recruited from the Champion Centre in Christchurch, New Zealand. It is a multidisciplinary early intervention centre for children with multiple developmental delay and their families that follows the principles of social-interactionist theory (Bohannon & Bonvillian, 2009) and the transactional model (Sameroff, 2004, pp. 7-11). The clinicians at the centre work closely with the caregivers to prepare their children for inclusion in their community, early childhood and primary school (The Champion Centre, 2005). The dyads of this study were selected because the children (i) were of chronological age of two to six years old; (ii) were identified as having language conversational difficulties by their attending SLTs at the centre; (iii) were not participating concurrently in other intensive behavioural intervention other than their regular multi-disciplinary intervention programme at the centre; (iv) did not have any visual or hearing impairment that was detrimental to their speech and language development; (iv) used English as their first language; and (v) whose caregivers were about to attend the ITTT programme at the Champion Centre at the beginning of this study.

Table 3.1 summarizes the demographic information of the children and their caregivers who participated in this study. The children ranged in age from 2;4 to 3;7 years old at the beginning of the study. There were two boys and two girls in this study. Three of them had Down syndrome and one them was born prematurely (i.e., gestational age: 28 weeks) with a very low birth weight (1275 grams). This study included children of mixed aetiologies because it was responding to Fey's (1986) claims that the classification of children's conversational profiles should be based on their engagement at the conversational level, regardless of their age, cognitive abilities and formal linguistic skills. With regard to language skills, children were administered the Preschool Language Scale - Fourth Edition

(PLS-4; Zimmerman, Steiner, & Evatt Pond, 2002). Even though the PLS-4 is normed on the Australian population, it was used in this study because there were no New Zealand base language assessments at the time this study was conducted; in comparison with other standardised language assessments, the PLS-4 was normed on a population which share similar cultures as the New Zealand culture; and it is one of the widely used assessments in New Zealand. Two children presented with standard scores that were two standard deviations (SDs) below the sample mean, one child presented with a standard score that was 1.5 SDs below the sample mean and one child presented with a standard score that was one SD below the sample mean. The children of this study had been attending intervention with their caregivers at the same early intervention centre since infancy and were still attending intervention while their caregivers participated in the ITTT programme and after their caregivers completed the ITTT programme.

All caregivers involved in this study were the biological mothers of the child participants. The caregivers ranged in age from 32;9 to 38;3 at entry into this study. Three caregivers had completed tertiary education while one had completed post-high school education. One caregiver worked full time outside of the home while the three others were full time primary caregivers of their children at home. All child participants were living with their caregivers. Three of them were raised in two-parent families and one in a single-parent family. Only the fathers from the two-parent families were involved in their children's care and they were all employed full-time.

Table 3.1 Demographic information of the children and their caregivers

Participants	Child A	Child B	Child C	Child D
Age at baseline	2;4	2;5	2;9	3;7
Gender	Male	Female	Male	Female
Medical diagnosis	Down syndrome	Down syndrome	Down syndrome	Premature birth and low birth weight
Number of years attending intervention before entry into the study	2;3	2;2	2;8	3;3
PLS-4 standard scores at baseline	67 (-2SDs)	76 (-1.5SDs)	65 (-2SDs)	91 (-1SD)
Caregiver's status	Mother	Mother	Mother	Mother
Caregiver's age at baseline	38;3	37;7	32;9	35;2
Caregiver's education level	Tertiary	Tertiary	Post-high school	Tertiary
Caregiver's employment status	Full time homemaker	Full time homemaker	Full time homemaker	Full time employee

3.2.3 Procedure

In this study, data for analysis were collected in the form of video recordings. Conversations between each caregiver and child were recorded at their homes using a Panasonic digital video camera, model SDR-H250GN-S and then transferred into digital files for analysis. Before video-recording started, the caregivers were asked to interact with their children as they normally would if there was no observer in their homes. They were asked to either play or take part in a routine with their children. No restrictions were given regarding play or position of the participants in their homes. All toys and items used in the interactions belonged to the participants. Recording was discontinued if a child began to cry or fuss and could not be re-engaged. The play interactions recorded were 20 to 25 minutes in length.

Three caregiver-child conversations were obtained before the ITTT programme started (baseline phase), three were obtained as the caregivers were attending the ITTT programme (intervention phase) and two after the completion of the programme (follow-up phase). The total number of sessions used for data collection was eight for each dyad.

(i) Baseline phase

Video-recording of the three baseline measurements for this phase were carried out across three weeks with at least a seven day gap between each baseline session. The play interactions recorded involved the caregiver and child, engaging in a free-play session. While it is acknowledged that to obtain reliable internal validity, the single subject design requires stable baseline measures, the number of baseline time-points reported in this study were constrained by the clinical structure of the ITTT programme and from which this study was drawn and other participant factors (e.g., limited time in the baseline phase; the ITTT programme commenced at the same time for all participants, or cancellation of recording sessions).

(ii) Intervention phase

The ITTT programme was conducted by two ITTT certified SLTs of the early intervention centre who had received training at a Hanen certification workshop. The parents chose to attend the program after attending the orientation meeting conducted by the SLTs. The programme consisted of eight weekly sessions, and was held in the evening. There was a two week break between week five and eight, making the total duration of the programme 10 weeks. Each session lasted approximately 2 ½ hours, making it a 20 hour programme in total. Two of the caregivers attended the programme with their spouses.

The intervention programme was conducted following protocols specified by Pepper, Weitzman, & McDade (2004). In the programme, the caregivers were provided with information about language and communication development, training on a number of conversational facilitative techniques and support from the SLTs and other caregivers. In these sessions, training was carried out in the form of short talks, video demonstrations, role play, take home activities, discussions, and feedback about the success and challenges faced by the caregivers when implementing the programme with their children. The intervention programme also included three individual video feedback sessions whereby the SLTs recorded a caregiver-child conversation at their homes in each session. The SLT then reviewed the caregivers interaction styles immediately, using the video-records.

(iii) Follow-up phase

Two follow-up measurements were taken two weeks and two months after the caregivers' completion of the ITTT programme.

3.2.4 Transcription and coding of the caregiver-child conversations

The investigator transcribed the caregiver-child interactions using the protocol described in Chapter 2. Then, the investigator coded the transcripts using the conversational topic turn and facilitative coding systems described in Chapter 2.

3.2.5 Outcome measures

The codes in each transcript were measured for change in the (i) caregivers and the children's verbal conversational topic turns; and (ii) caregivers' use of facilitative techniques.

Outcomes for conversational topic turns were the rates of topic changes (TCs) per minute, rates of topic extensions (TEs) per minute, and rate of topic maintaining responses (TMs) per minute. Outcome measures for caregiver's facilitative techniques were rates of imitations per minute, rates of expansions per minute, rates of follow-in questions per minute, and rates of follow-in cloze procedures per minute. The use of rates per minute followed the method used by Girolametto et al. (2007).

3.3 Reliability

3.3.1 Treatment fidelity

This ITTT programme was conducted by qualified Hanen SLTs who had received trainings at the Hanen certification workshops. The programme was implemented according to the protocols specified by Pepper, Weitzman, & McDade (2004). Materials used in the intervention sessions and handouts provided to the caregivers were from the ITTT Hanen programme training materials. While the caregivers used a guidebook entitled, It Takes Two to Talk ™: A practical guide for parents of children with language delays (Pepper & Weitzman, 2004), the SLTs used a guidebook entitled, Making Hanen happen: It Takes Two

to Talk-The Hanen Program for Parents: Leaders guide for certified speech-language pathologists (Pepper, et al., 2004).

3.3.2 Transcription and coding reliability

Accuracy of transcription according to the CHAT conventions was verified using the automatic facilities of the CHILDES system and accuracy of the coding convention was verified by a software designed for this purpose. 81.25% of the total transcripts were verified for content reliability by another transcriber and 40.63% of the total transcripts were verified for coding reliability by another coder. Verification was done as they read the codes on the transcripts while watching the videos (Girolametto, et al., 2007; Johnston, 2001). Disagreements were noted and resolved through discussions with the original transcriber. Amendments were then made on the transcripts. Consensus reliability was conducted on the transcripts before any corrections were made, using the formula: number of agreements/(the number of agreements + disagreements) X 100. Consensus reliability for transcription of the caregivers' utterances was 97.72% (*N*=7887) and child utterances was 99.65% (*N*=6271). Consensus reliability for the coding of the caregivers' conversational codes was 98.50% (*N*=3801); caregivers' facilitative techniques was 93.19% (*N*=998); and the coding of the children's conversational codes was 99.47% (*N*=4317). Finally, the same coder also independently coded three randomly selected transcripts and for these transcripts, consensus reliability for the caregivers' conversational codes was 80.35% (*N*=402); caregivers' facilitative techniques was 84.54% (*N*=97); and the coding of the children's conversational codes was 89.47% (*N*=340).

3.4 Results

This study aimed to investigate (i) changes in the rate of the caregivers conversational topic turns; (ii) changes in the rate of the caregivers facilitative techniques; (iii) changes in the children's rate of conversational topic turns; and (iv) individual variations in the change of conversational skills among the participants following the ITTT programme. The results of this study were analysed using the two standard deviation (2 SD) band method (Portney & Watkins, 2000). The change in each outcome measure was reported as significant if at least two consecutive points in the intervention phase were 2 SDs above or below 2 SDs of the

baselines' mean and generalisation is reported as significant if the two points in the follow-up phase were 2 SDs above or below 2 SDs of the baselines' mean.

In general, the results obtained exhibit high variability across the baseline, intervention and follow-up phases. While the variability can be attributed to the inherent nature of conversations, it is acknowledged that the internal validity of the results is affected by the unstable baseline data points obtained. However, additional control measures such as the 2 SD band method and measuring the same outcomes across multiple subjects were taken to strengthen the validity of the results. The results of this study were interpreted within the constraints of this study and the additional measures taken.

3.4.1 Rates of caregivers' conversational topic turns

Following the first question of this study, which was to investigate the changes in the caregiver and children's conversational topic turns, three conversational outcomes were measured i.e., TC, TE and TM. There were three time points in the baseline phase, three in the intervention phase, and two in the follow-up phase. As expected, noticeable individual variations in the production of conversational topic turns were noticed across the caregiver-child dyads and across time.

Figure 3.1 presents the change in TC by the caregivers. In general, the rates of TCs produced by all caregivers were lower than their rates of TMs. As predicted, all caregivers' rates of TCs were lower than their baseline TCs when they first started intervention (first time point of the intervention phase). However, towards the end of intervention, individual variations were noticed across the caregivers. Caregivers A and C managed to maintain lower rates of TCs throughout both intervention and follow-up phases. Caregiver B's rates of TCs increased towards the end of intervention and in the follow-up phase but the rates were within the 2 SD band of the baseline TCs. Caregiver D also produced higher rates of TCs towards the end of intervention and during the first follow-up session, but the rate of TC decreased in the second follow-up. According to the 2 SD band method, Caregivers B, C and D significantly lowered their TCs in the intervention phase but only Caregiver C maintained this significant change in the follow-up phase.

Figure 3.2 depicts the change in TE for caregivers across the intervention programme. The production of TEs by all caregivers was generally the same as or slightly higher than TC, but lower than TMs, across all dyads and across all time points. More variability was observed in caregiver TEs than child TEs. In general, Caregivers A's and B's rates of TEs appear more stable across time, than Caregivers C's and D's rates of TEs. While a significant decrease in Caregiver B's TEs was noticed in mid intervention, this finding is assumed to be an effect of variability. Caregivers C and D presented with high levels of variability in their rates of TEs, with both significant increase and decrease in their production across all time points in both intervention and follow-up phases.

Figure 3.3 presents the changes in TMs across three phases. In producing TMs, although the caregivers used TMs more than TCs and TEs in their conversations, they displayed stable rates of TMs across time, with the exception of a gradual increase in Caregiver B's rates of TMs in the follow-up phase.

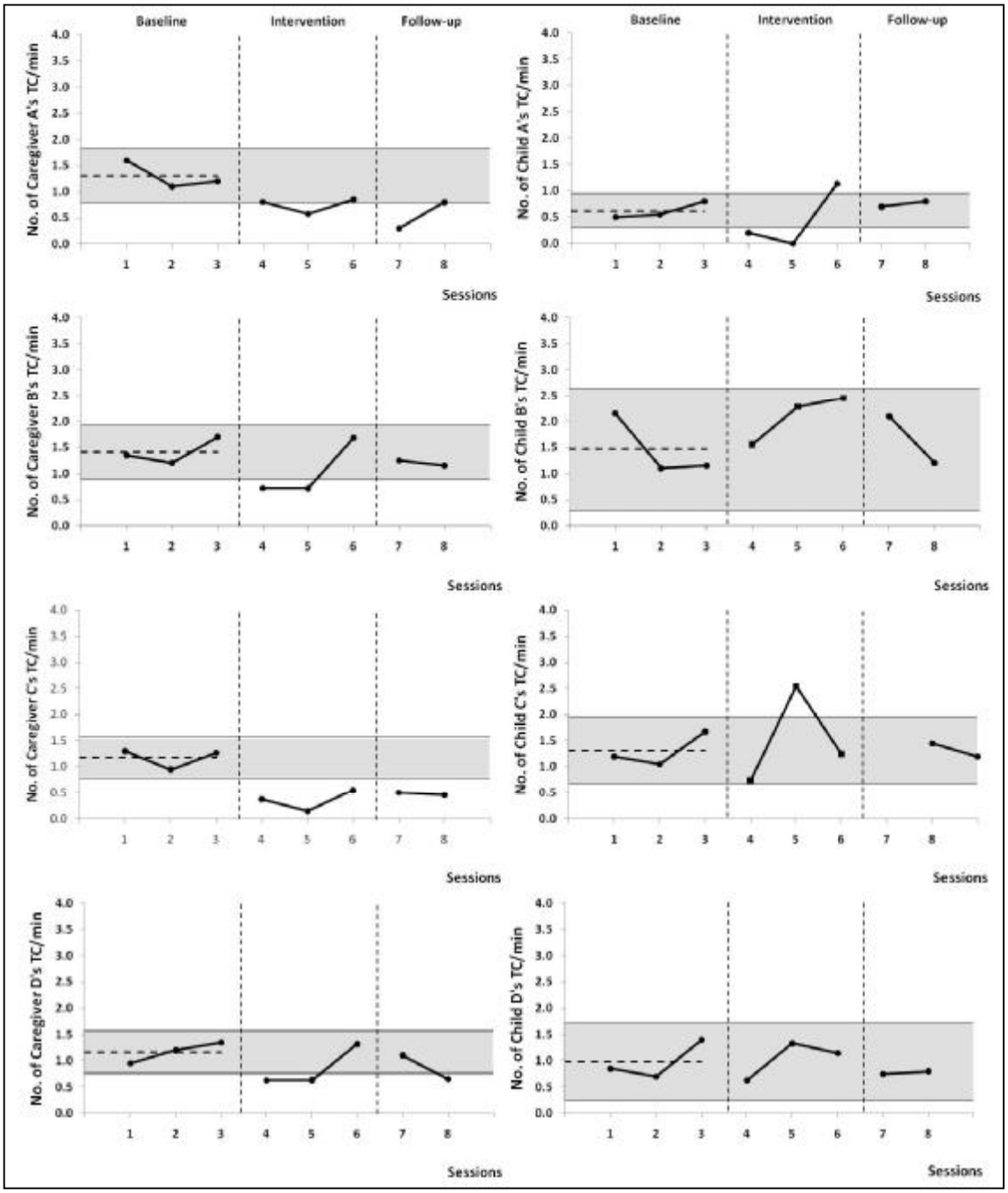

Figure 3.1 Rates of topic changes (TCs) produced by the caregivers and children

Note. Broken horizontal line indicates baseline mean; shaded area indicates 2 SDs above and below the baseline mean.

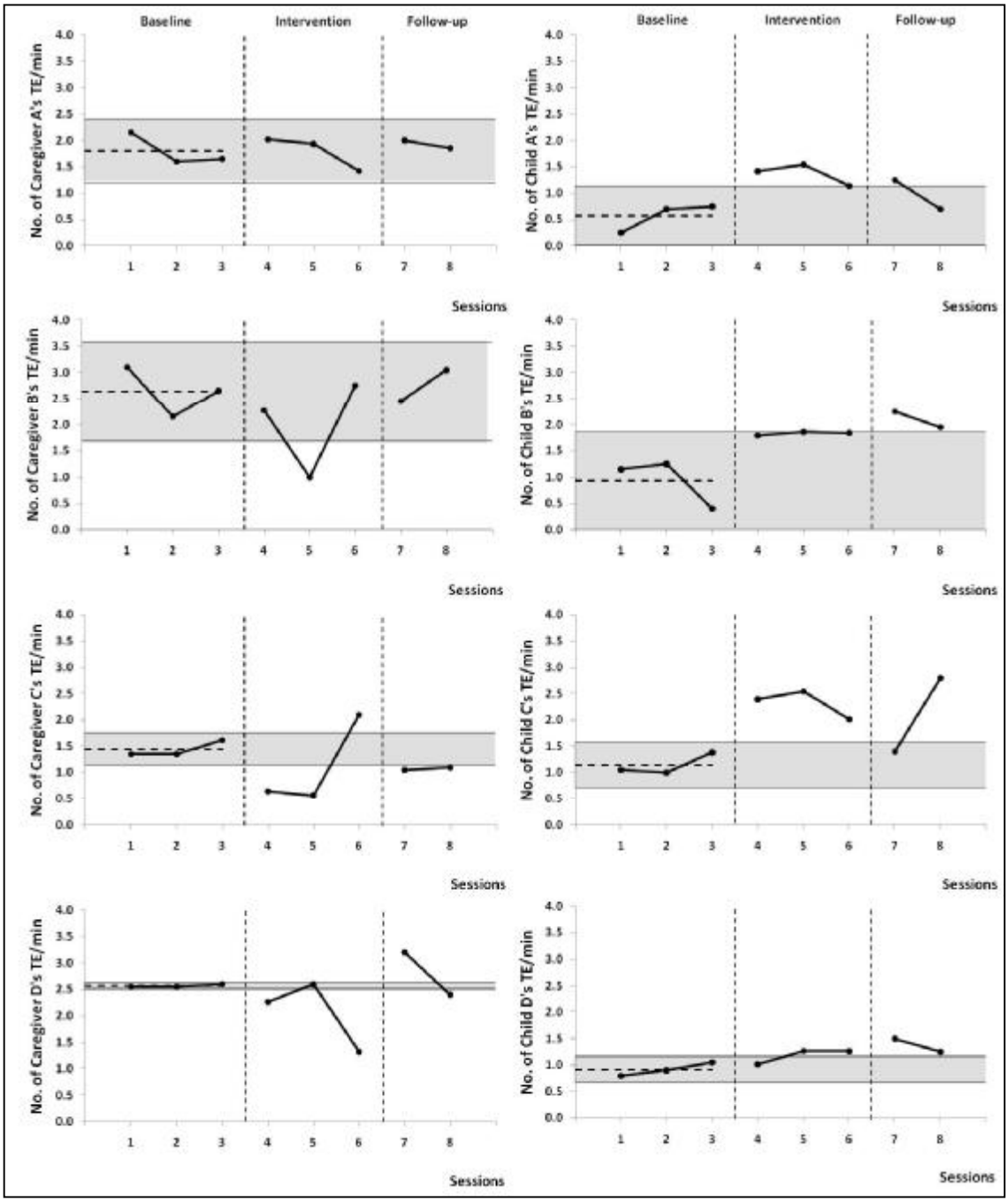

Figure 3.2 Rates of topic extensions (TEs) produced by the caregivers and children

Note. Broken horizontal line indicate baseline mean; shaded area indicates 2 SDs above and below the baseline mean.

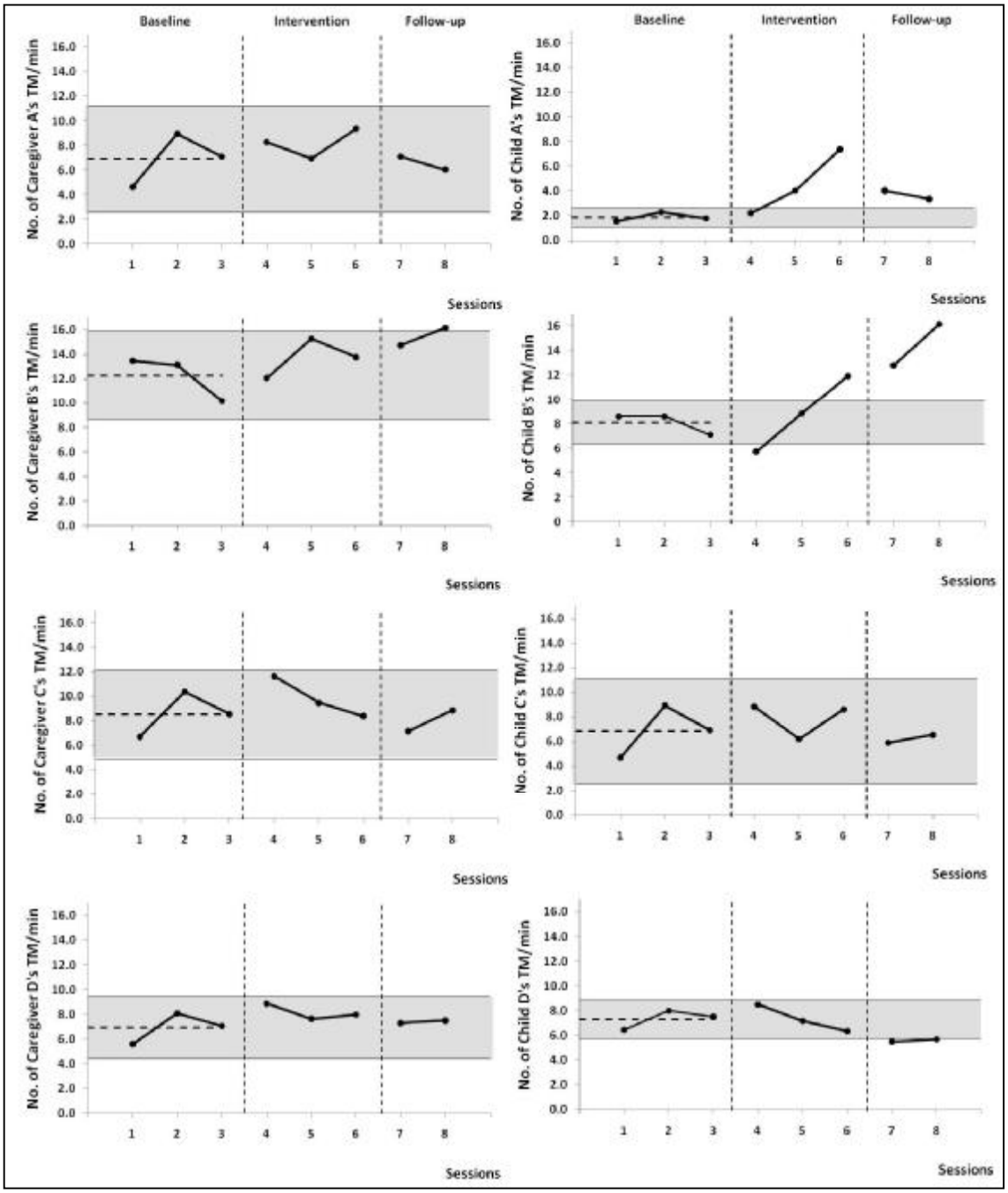

Figure 3.3 Rates of topic maintaining responses (TMs) produced by the caregivers and children

Note. Broken horizontal line indicates baseline mean; shaded area indicates 2 SDs above and below the baseline mean.

3.4.2 Rates of caregiver's facilitative techniques

The second question of this study concerned changes in the caregivers' facilitative techniques. The facilitative techniques measured were imitation, expansion, follow-in wh-questions, and follow-in cloze procedures. These techniques were measured in rates per minute. Table 3.2 displays the rates of caregivers' facilitative techniques across time.

Results show that the changes in facilitative techniques vary across caregivers and techniques. Caregivers A and B showed consistent and significantly higher rates of imitation than their baseline levels, in the intervention and follow-up phases. In using expansions, Caregivers A, B and C increased their production of expansions during the intervention phase but only Caregiver C's changes were significant. Caregiver B's rates of expansion remained higher than the baseline rates in the follow-up phase but the difference was non-significant. Caregiver C showed higher rates of expansions than the baseline rates only in the second follow-up session. Considerable variations in the level of significance of rate of expansions was noted across time for Caregivers A, B and C. None of the caregivers demonstrated significant change in their use of follow-in questions. Finally, results show significant increases in the caregivers' use of follow-in cloze procedures in the intervention and follow-up phases. Caregivers B and C showed significant changes in their rates of follow-in cloze procedures in both intervention and follow-up phases and Caregiver A showed significant changes in the rates of follow-in cloze procedures in the follow-up phase. For Caregivers A, B and C, follow-in cloze procedure appears to be the technique used with the most changes. However, Caregiver D's use of follow-in cloze procedures was low across all time points in both intervention and follow-up phases.

Table 3. 2 Rates of caregivers' facilitative techniques across time

Caregiver	Facilitative technique	Baseline (BL)			Mean of BL	± 2SD	Intervention			Follow-up	
		Session					Session			Session	
		1	2	3			4	5	6	7	8
A	Imitation	0.05	0.15	0.05	0.08	0-0.20	0.20**	0.39**	1.14**	0.75**	0.20**
	Expansion	0.45	0.15	0.00	0.20	0-0.66	0.81**	0.00	1.14**	0.40	0.20
	Follow-in questions	1.55	1.45	1.30	1.43	1.18-1.68	1.01*	1.35	1.42	1.15	1.25
	Follow-in cloze procedure	0.00	0.00	0.00	0.00	0-0.00	0.00	0.00	0.28**	0.25**	0.15**
B	Imitation	1.70	2.55	1.40	1.88	0.69-3.08	1.08	4.71**	3.83**	3.85**	4.30**
	Expansion	1.10	1.35	0.50	0.98	0.11-1.86	0.24	0.57	2.91**	1.60	1.75
	Follow-in questions	1.25	0.40	1.80	1.15	0-2.56	1.08	0.71	1.99	0.70	1.35
	Follow-in cloze procedure	0.05	0.45	0.60	0.37	0-0.94	0.24	3.29**	2.30**	3.55**	2.15**
C	Imitation	1.35	1.65	0.81	1.27	0.42-2.12	2.40**	1.69	1.16	1.55	2.25**
	Expansion	0.15	0.40	0.12	0.22	0-0.53	0.28	1.13**	0.54**	0.10	0.95**
	Follow-in questions	0.40	0.25	1.67	0.77	0-2.34	0.83	0.42	0.31	0.80	0.65
	Follow-in cloze procedure	0.00	0.05	0.12	0.06	0-0.17	0	0.28**	0.47**	0.45**	0.35**
D	Imitation	0.55	0.60	0.20	0.45	0.01-0.89	0.08	0.49	0.42	0.05	0.60
	Expansion	1.25	0.70	1.15	1.03	0.45-1.62	1.01	0.91	0.96	0.65	1.20
	Follow-in questions	1.55	2.90	1.10	1.85	0-3.72	0.94	2.25	1.44	0.75	1.00
	Follow-in cloze procedure	0.00	0.15	0.00	0.05	0-0.22	0.08*	0.42	0.00	0.00	0.00

Note. * indicates that the value is lower than 2 SDs below the mean of BL; ** indicates that the value is greater than 2 SDs above the mean of BL.

3.4.3 Rates of the children's conversational topic turns

Figure 3.1 displays the rates of TCs produced by the children. All children demonstrated stable rates of TCs across time. Child A displayed high level of variations in the production of TCs. There were significant decreases in the rates of TC in the first two time points in the phase but the rates of TCs increased thereafter and were non-significantly different from the baseline TCs in the follow-up phase. For Children B, C and D, their rates of TCs appeared non-significant in the intervention and follow-up phases.

Figure 3.2 depicts the rates of TEs produced by the children. Results show that contrary to the caregivers' inconsistent TEs, all children produced significantly higher rates of TEs than their baseline TEs, after their caregivers attended the intervention programme. All children, except Child A managed to maintain significant increases of TE production in the follow-up phase. Child A showed a significant increase in the rates of TE in the intervention phase but the rate decreased to a non-significant level in the second follow-up session.

Finally, in producing TMs, as shown in Figure 3.3, the children exhibited two types of changes in the intervention phase, as their caregivers were attending the intervention programme. The first type of change is a gradual increase in the rates of their TMs by Children A and B. Child A produced significantly higher TMs than the baseline rates in the intervention phase and managed to maintain this in the follow-up phase. Child B's rates of TMs were significantly higher than the baseline TMs in the follow-up phase. The second type of change is stable production of TMs following intervention, by Children C and D. Child C's rates of TMs remained non-significantly different from the baseline levels. Surprisingly, Child D's rates of TM in the follow-up phase were at the borderline of 2 SDs below the baseline mean.

3.4.4 Individual profiles

The last question of this study concerned the individual profiles of the dyads observed in this study. Table 3.3 summarises the noticeable changes observed in each caregiver and child. As expected, considerable variations are noticed in the caregiver and child outcome measures.

Caregiver A showed positive changes in her conversational topic turns, with lower rates of TCs. Positive changes are also noticed in the use of three types of facilitative techniques (i.e., imitation, expansion and follow-in cloze procedures). Concurrently, Child A showed an increase in conversational assertiveness and responsiveness, with significant increases in the production of TEs and TMs.

Caregiver B also showed an increase in her use of contingent topic turns, with a significant increase in her rates of TMs. The changes demonstrated by Caregiver B were more prominent in the rates of facilitative techniques than in other outcome measures. There was an increase in the rates of imitation, expansion and follow-in cloze procedures in Caregiver B's language input. Two of these techniques, imitation and follow-in cloze procedure were produced significantly more frequently than the baseline rates. Child B's improvement in conversational skills include higher rates of TEs and TMs.

Caregiver C's positive change in conversational skills were indicated by a significant decrease in rates of TCs. There were significant increases in Caregiver C's production of expansion and follow-in cloze procedure following intervention. Concurrently, Child C's improvement in conversational skills was indicated by an increase in TEs.

Of all dyads, Dyad D showed the least changes in their conversational skills. There was a decrease in caregiver TCs but this was not maintained post-intervention. Caregiver D's use of conversational topic turns and facilitative techniques was stable across time. Concomitantly, Child D showed significant increases in the rates of TEs but decreases in rates of TMs.

Table 3.3 Summary of the changes observed in each caregiver and child

	Conversational topic turn			Facilitative technique			
	TC	TE	TM	IMI	EXP	WHQ	CPR
Caregiver A	√*	–	–	√*	√*	–	√*
Child A	–	√*	√*	NA	NA	NA	NA
Caregiver B	–	–	√	√*	√	–	√*
Child B	–	√*	√*	NA	NA	NA	NA
Caregiver C	√*	X	–	√	√*	–	√*
Child C	–	√*	–	NA	NA	NA	NA
Caregiver D	√*	–	–	–	–	–	–
Child D	–	√*	X	NA	NA	NA	NA

Note. TC=topic change; TE=topic extension; TM=topic maintaining response; IMI=imitation; EXP=expansion; WHQ=follow-in question; CPR=follow-in cloze procedure; √=positive change; √*=significant positive change; X=negative change; –=stable rates; NA=not applicable.

3.5 Discussion

This study aimed to investigate the changes towards achieving contingency in caregivers and children's conversational topic turns through conversational topics and facilitative techniques, following the ITTT programme. The first three research questions were concerned with the changes in the way caregivers scaffold their children's conversational contingency through the use of conversational topic turns and facilitative techniques, and the last question concerned individual variability observed following intervention.

In order to address the first three questions, the conversational topic turns measured were TC, TE and TM, and the facilitative techniques measured were imitation, expansion, follow-in questions and follow-in cloze procedures. Findings of past studies showed a decrease in caregivers' initiation of interactions and an increase in their responses, and an increase in child initiation of interactions and responses (Girolametto, 1988; Girolametto, et

al., 1996; Pennington, et al., 2009) following intervention. Therefore, it was predicted that the caregivers in this study would decrease their directiveness in conversations through lower rates of TCs and improve topic contingency through higher rates of TMs following intervention. It was also predicted that concurrently, their children would exhibit higher assertiveness through higher rates of TCs and TEs, as well as improved responsiveness and topic contingency through higher rates of TEs and TMs. Increases in the use of facilitative techniques were also expected, as documented in the literature (Girolametto, et al., 1996; Girolametto, et al., 2007; McConachie, et al., 2005). The findings of this study revealed that following intervention, the caregivers produced fewer TCs but substantial variability in their change of TEs. One out of four caregivers increased the rates of TMs but three of them produced stable rates of TMs. Three out of four of them showed significant increases in their use of imitation, expansion and follow-in cloze procedures following intervention. Conversely, their children produced significantly higher TEs following their caregivers' participations in the ITTT programme but did not change their production of TC across time. Increases in child TMs were observed in only two of the four children.

The decrease in caregivers' TC is consistent with the literature and supports the notion that caregiver training programmes are efficient in helping caregivers to decrease their directiveness and increase contingency in conversations by increasing coordination of joint attention with their children. TCs also lack contextual cues from the preceding topic, and therefore have less facilitation effect. While caregivers showed a lack of significant increases in their production of TEs and TMs, they exhibited increases in their use of facilitative techniques. These findings suggest that even though intervention did not help them to improve the quantity of their contingent conversational topic turns substantially, it still has the potential to increase their awareness in the use of facilitative techniques. Caregivers learnt to incorporate the use of more imitations, expansions and cloze-procedures that carry linguistic and pragmatic elements for language facilitation. Facilitative techniques have been argued to contain temporal and semantic contingencies that help children to distinguish both new linguistic information and those that are already in their linguistic repertoire with less cognitive demands (Gogate & Hollich, 2010; K. E. Nelson, 1989). Therefore, although the caregivers did not show substantial significant positive changes in the way they extended and maintained conversational topics, there appears to be an increase in conversational contingency through the use of facilitative techniques.

Concurrently, the findings from the children of this study also support that caregiver training programmes facilitate positive changes in caregivers' CDS, which then appears to influence their children's conversational skills. While the children did not show significant increases in their production of TCs, all of them showed consistent increase in TEs and two of them increased their production of TMs too. Fey (1986) suggested that an increase in TCs and TEs in children's conversational turns reflect improved assertiveness. However, Fey also cautioned that an excessive increase in TC may also a reflect lack of contingent responsiveness and therefore, there needs to be a balance between the use of TCs and TMs. TEs on the other hand, reflects a contingent change in the focus of the conversational topic. Therefore, an increase in the use of child TE may be better indications of assertiveness in the context of topic contingency than an increase in child TC. These findings add to the body of knowledge in understanding the development of achieving conversational contingency in children with pragmatic difficulties. It is suggested that the children achieve conversational contingency through an increase in the rates of TEs and TMs. These changes could be scaffolded by the caregiver's facilitative techniques, and a decrease in their TC production.

While it is suggested that scaffolding of the children's conversational topic turns in this study was supported by the caregivers' facilitative techniques, a more detailed analysis of the specific types of facilitative techniques revealed that the technique in which the caregivers showed the most noticeable increases was cloze procedure. Conversely, they did not show significant changes in their use of follow-in questions. One possibility for these findings is that the caregivers may feel rewarded by their children's responses following cloze procedures in routines. Therefore, feedback from their children motivated them to increase their use of cloze procedures as prompts for more conversational topic turns from their children. This would be predicted by social-interactionist theory (Bohannon & Bonvillian, 2009) and transactional model (Sameroff, 2009) which claim that interaction between caregivers and their children are dynamic and require reciprocal feedback from both caregivers and children. Using the same principles, it is suggested that the lack of change in caregivers' use of follow-in questions could be possibly related to their children's lack of responses to these questions. A probable reason for this may be the children's lack of comprehension of those questions. Even though follow-in wh-questions carry highly facilitative features, it is suggested that their facilitative effects may not take place if the child lacks comprehension of wh-forms (Rowland, et al., 2003). In addition, cloze procedure, by its nature may be easier to comprehend than wh- forms because it consists of a declarative

sentence. The salient pause in the end of the sentence may be perceived by the children as an explicit invitation to take the conversational floor (Brady, et al., 2005). These findings were contrary to expectations because questions are taught more overtly than cloze-procedures in the ITTT programme, so it would be instinctive to expect the caregivers to increase their rates of wh-questions instead of cloze procedures. Extending the argument that the caregivers' did not demonstrate significant changes in their use of wh-questions because of their children's lack of responses to these questions, it could also be that prompting by commenting about the conversational activity (with a cloze procedure) is easier than prompting by requesting for information about the conversational activity (with a wh-question). In the literature, even though cloze procedures have been documented as having the potential to elicit more semantically and syntactically complex child utterances, this was reported mainly in the context of shared book reading (Bellon-Harn, et al., 2004; Bradshaw, et al., 1998; van Kleeck, Vander Woude, & Hammett, 2006). The finding of this study extends the benefits of cloze procedures to conversations revolving around other routines and familiar activities.

In this study, the three caregivers who increased their use of cloze procedures also increased their use of imitation. Simultaneously, two of these three caregivers increased their use of expansions. Pragmatically, imitations and expansions are positively associated with the total number of utterances in conversations (Girolametto, et al., 1999), displacement topics about the past (Tamis-LeMonda, et al., 2001), and children's contingent responses in the form of imitation (Scherer & Olswang, 1984). Therefore, it is argued that use of these two techniques by the caregivers have facilitated their children's conversational skills too. Although the current study did not examine linguistic outcomes of caregivers' facilitative techniques, the literature suggests that the benefits of imitations and expansions extends to language development including improvement in vocabulary, use of multiword utterances, use of semantic relations, morpho-syntactic skills, language scores and speech intelligibility (Farrar, 1990; Girolametto, et al., 1999; Hoff-Ginsberg, 1990; Loeb & Armstrong, 2001; Masur & Olson, 2008; McDuffie & Yoder, 2010; Scherer & Olswang, 1984; Yoder, et al., 1997).

Finally, regarding the last question which concerns individual variability among the participants of this study, the results of this study revealed high variability across caregivers and across time. While this variability could be inherently due to caregiver and child personal factors such as temperament, sociability (Bornstein, et al., 2007), and unexpected changes in their conversational environment, the variations in the distribution of caregivers'

conversational measures seem to/may influence the type of changes exhibited by their children. Children whose caregivers showed wider range of changes in both conversational and facilitation skills, also presented with more positive changes in their conversational and language skills. For example, Caregivers A, B and C displayed more changes in their conversational and facilitation outcomes than Caregiver D. Concurrently, their children showed similar changes in their conversational outcomes. On the other hand, Caregiver D presented with the least changes in the outcomes measured and this was reflected in her child's conversational outcomes. The substantial variability in Caregiver D's conversational and facilitative outcomes may be attributed to the differences in Child D's developmental profile. While Children A, B and C presented with Down syndrome, Child D was a preterm child, chronologically older than the other children, and presented with a more mild language difficulty than the other children. As it is claimed that caregivers fine-tune their level of responsiveness according to their children's quality of responsiveness to their caregivers (Mahoney & NevilleSmith, 1996; Pennington & McConachie, 1999; Tannock, 1988), Caregiver D's lack of change may be due to a reasonably acceptable level of responsiveness from her child since the beginning of the study. Curcio and Paccia (1987) found that when children improve their quality of responsiveness, caregivers reduce their prompts, to match the zone of proximal development (Vygotsky, 1978) that their children need for further language advancement. Perhaps for Child D, facilitation of conversational topic turns in more specific forms such as TEs and TMs in the form of grammatical recasting may elicit more contingent topic turns than the facilitative techniques measured here. The findings of this study support past findings that claimed improvement in caregivers' and children's conversational skills following intervention involves a complex interaction of various personal, developmental and contextual factors (Bornstein, et al., 2007; Drake, et al., 2007; Huttenlocher, et al., 2007; Pancsofar, et al., 2008).

3.6 Clinical implications

The findings of this study support the effectiveness of intervention programmes that focus on improving caregivers' and children's conversational skills. Caregiver training programmes that provide knowledge on children's development and training on conversational responsiveness help caregivers to reduce non-facilitative behaviours such as

TCs. At the same time, they learn to increase their use of contingent topic turns and facilitative techniques. It is suggested that the use of TCs, TEs and TMs is highlighted to caregivers in intervention sessions to increase their awareness of the use of these topic turns in scaffolding their children's conversational skills. As is evident in this study, because of the inherent variability of conversations, it is proposed that evaluation of caregivers' and children's progress following intervention should include all aspects of conversational skills. Gathering information from all areas will help clinicians to identify caregivers' and children's strengths and weaknesses more precisely, while acknowledging challenges that caregivers' and their families are facing. This approach has been argued to be essential in family-focused intervention programmes (Bailey et al., 1986), and in helping caregivers to feel empowered with their facilitation skills.

3.7 Limitations and directions for future research

For future research, it is suggested that the variables of this study are investigated with a larger group of participants. As a single subject experiment is used to analyse "treatment responders" and "treatment non-responders" on an individual basis with control for threats to internal validity, this study can be followed by a randomised group experiment to further investigate the potential predictors of treatment effects (Yoder & Compton, 2004). In this study, the quality of the caregivers' conversational topic turns was quantified as facilitative techniques. It is suggested that the quality of their children's topic turns is quantified with more language measures such as grammatical elements. It is also suggested that future studies tease out how the conversational topic turns of children with different language levels can be facilitated with the most efficient technique. As the caregiver-child interactions in this study were obtained from the dyads' engagement in familiar activities and routines, it is suggested that the type of activities that the caregiver-child dyads engaged in contributed to the significant increase in TEs across all children. These activities provided opportunities for the caregivers to repetitively highlight the shared context and expectations of the subsequent topic turns in the activities (Fivush & Slackman, 1986; Lucariello, et al., 1986). Therefore, future studies should explore how children's conversational topic turns affect the advancement of their conversational activities.

3.8 Conclusion

In conclusion, the findings of this study support that caregiver group training programmes help them to increase contingency in their conversational topic turns, which subsequently, facilitate an increase in contingency in their children's topic turn production.

CHAPTER 4

STUDY 2

CHANGES IN CAREGIVER-CHILD CONVERSATIONAL SKILLS FOLLOWING AN INDIVIDUAL CAREGIVER-CHILD INTERVENTION PROGRAMME: CASE SERIES

4.1 Introduction

Conversational difficulties have been documented as a key area of concern for children with autism spectrum disorder (ASD; Knott, Dunlop, & MacKay, 2006; Tager-Flusberg et al., 2009). Conversational difficulties reported in children with ASD include frequent topic changes, lack of semantic contingency between turns, inappropriate reciprocal turn-taking, poor conversational repair strategies, poor comprehension of conversational contexts and less spontaneous communication (Forde, Holloway, Healy, & Brosnan; Knott, et al., 2006; Philofsky, et al., 2007; Rapin & Dunn, 2003; J. E. Roberts, Martin, et al., 2007). Using Fey's (1986) social-conversational profile, children with ASD are often categorised as verbal non-communicators. That is, they are able to contribute new topics in conversations but have difficulties applying their language skills to maintain and extend conversational topics and to contribute turns that share their partner's communication goals. The extent of this verbal non-communication varies among individuals and has been shown to be positively associated with the severity of other ASD symptoms (Hale & Tager-Flusberg, 2005; Philofsky, et al., 2007).

Conversational difficulties reported among children with ASD are often associated with a core deficit in joint attention (Mundy & Thorp, 2008; Schertz & Odom, 2004; Warreyn, et al., 2005; Wetherby, 2008) and social-emotional development (Greenspan & Wieder, 1997). Although joint attention develops in stages, it is the delay or inability to initiate joint attention and respond to other bids of joint attention that is the most robust (Yoder & McDuffie, 2008) for the acquisition of advanced conversational skills (Brady, et al., 2005; Mundy & Thorp, 2008). Without these precursors, the development of skills such as Theory of Mind (Miller, 2006), semantic inferencing and social referencing (Botting &

Adams, 2005) may be suppressed. These skills are important for interpreting the meaning and intention of others' utterances, and for the production of information that is relevant to the conversational context.

As conversation is a two-way interaction, the conversational difficulties that arise from ASD are not limited to the speaker. It has been reported that conversational difficulties in children with ASD can affect the conversational style of their caregivers (Howe, 2006; Watson, 1998). For instance, Watson (1998) showed that while mothers of preschool children with ASD linguistically map their children's focus of attention as often as mothers of typically developing children, they also change conversational topics by directing their talk to items and events that are out of their children's focus of attention more frequently than mothers of typically developing children. As topic changes are negatively associated with children's typical development of conversation (Black & Logan, 1995; Mahoney & NevilleSmith, 1996; Norris & Hoffman, 1990a; Rescorla & Fechnay, 1996; Rocissano & Yatchmink, 1984) and other aspects of language (Akhtar, et al., 1991), frequent use of topic change may compound the conversational challenges that children with ASD have to cope with. These changes have been shown to be associated with children's lack of responsiveness in conversations (Mahoney & NevilleSmith, 1996; Pennington & McConachie, 1999; Tannock, 1988) rather than a direct result of the ASD diagnosis.

Caregivers who are able to fine-tune their language input to their children's language levels despite their children's language difficulties provide better language facilitation than caregivers who have difficulty doing so. For instance, in a study involving children's conversations between adults and children with ASD, Curcio & Paccia (1987) observed that when the adults increased their use of facilitative techniques and other contingent turns following children's inadequate responses, the children produced more appropriate responses. In a longitudinal study involving caregivers and their children with ASD, Siller & Sigman (2002) showed that children of caregivers who demonstrated greater joint attention when playing with their children at one year old, exhibited higher joint attention skills and language skills at 10 and 16 years old, than children of caregivers who showed lower levels of synchronisation in joint attention in their early caregiver-child interactions. Siller & Sigman (2008) further claimed that longitudinal changes in caregivers' responsiveness to their children can be independently predicted by both their children's responsiveness to their bids for joint attention and the caregivers responsiveness to them, suggesting that language learning through conversations is a collaborative process. This view is in line with the social-

interactionist theory (Bohannon & Bonvillian, 2009) and transactional model (Sameroff, 2009).

Therefore, in language intervention for children with ASD, it is important to facilitate joint attention. This can be achieved by helping caregivers to recognise, understand and interpret their children's behaviour, body language, facial expressions and communication attempts (Howe, 2006). One approach to help caregivers is through caregiver training. Caregiver training in language intervention for young children with ASD, is recommended by the United States National Research Council (2001). Studies have shown that such intervention programmes benefit caregivers and their children significantly after intervention. For instance, caregivers reduced their rates of topic change, increased their rates of topic maintaining responses and increased their use of facilitative techniques following caregiver-implemented intervention programmes for children with ASD, such as the More Than Words® Hanen Program for Parents (Girolametto, et al., 2007; McConachie, et al., 2005). These programmes also reported concurrent improvement in children's vocabulary development, conversational skills, and other social-communication skills. Specifically, following intervention, a few types of facilitative techniques in CDS are claimed to have positive correlations with the development of spoken vocabulary in children with ASD. These techniques include follow-in comments such as imitation and expansion, and follow-in directives (McDuffie & Yoder, 2010). From a systematic review of parent implemented early intervention for young children with ASD that was conducted by McConachie & Diggle (2007), it was concluded that the effectiveness of caregiver-implemented early intervention also include increased caregiver knowledge of ASD, enhanced caregiver communication style (e.g., information giving, praise, correct responses, direct responses, total number of maternal utterances, less number of interjections and incomprehensible utterances), greater synchrony in caregiver-child interaction and reduced depression in caregivers.

As intervention for children with ASD warrants caregiver training that specifically addresses children's difficulties (Rogers, 2008), this study aimed to examine the impact of a direct caregiver training programme on conversational contingency between caregivers and children with ASD. The study described in this chapter analysed the outcome measures described in Study 1 (Chapter 3): (i) conversational outcome measures [i.e., topic changes (TCs), topic extensions (TEs) and topic maintaining responses (TM)]; and (ii) facilitative techniques (i.e., imitation, expansion, follow-in questions, and follow-in cloze procedures),

using a case series design on three caregiver-child dyads, and through another intervention programme.

The intervention programme reported here is known as the Relating and Communicating (RC) programme. RC is implemented at the Champion Centre, Christchurch and it is a multi-disciplinary programme specifically designed for children with compromised sensory systems, including those with ASD (The Champion Centre, 2005; Tatterson, Murphy, Ritchie, & van Tongeren, 2011). The multidisciplinary team of the RC programme comprises a speech-language therapist (SLT), occupational therapist, a clinical psychologist, a music therapist/specialist, and an educational support worker. The RC programme has intervention goals that are similar to the It Takes Two to Talk Hanen Program for Parents (Manolson, 1992; Pepper & Weitzman, 2004) described in Study1. These goals focus on promoting communication and language growth through caregiver-child interactions. However, this is a one-on-one intervention programme that besides addressing the children's communication and language difficulties, also addresses the children's social-emotional and sensory deficits. Caregivers attend this programme with their children for individual sessions which focus on providing early joint attention and social-emotional experiences through activities that facilitate the regulation of the child's motor and sensory system. These physical activities are carried out within the context of caregiver-child interactions. The SLT plays an important role in encouraging both verbal and non-verbal interaction in the context of shared activities with the expectation that in order to advance children's communication skills they need first to develop the relational basis for sharing ideas with another person and then to sustain attention to topics that can be shared with that other person. The RC programme has been demonstrated to increase "moments of meeting", such as mutual gaze, vocalisations, physical proximity, approach behaviours, and gestures (Tatterson, et al., 2011; Worner, 2001) between the caregivers and children.

As the RC programme has goals that are similar to that of the ITTT programme, questions raised in Study 1 were also raised here: (i) "Does the caregivers' use of conversational turns change following intervention?" (ii) "Does the caregivers' use of facilitative techniques change following intervention?" (iii) "Does the children's use of conversational turns change following their caregivers' participation in intervention?" and (iv) "What are the individual variations among the participants of this study?" The findings of The findings of Study 1 suggest that increases in caregivers' contingent turns and facilitative techniques are likely to facilitate increases in the rates of their children's contingent topic

turns. As the RC programme has goals that are similar to that of the ITTT programme, it was expected that the caregivers' production of contingent topic turns and facilitative techniques, as well as the children's production of contingent topic turns would increase following their participation in the RC programme.

4.2 Method

4.2.1 Research design

This is a case series study that aims to investigate the change in conversational skills of three caregiver-child dyads of children with features of ASD. A case series is an expansion of a case study, in which observations of several similar cases are documented and reported (Portney & Watkins, 2000). It provides a comprehensive understanding and investigation of those factors important to the aetiology, present status and response to treatment. As the major contribution of a case study to research is its ability to provide information that can be used to generate inductive hypotheses that can be tested using explanatory or experimental methods, this study aimed to (i) report the changes observed in the conversations of these three dyads, and (ii) to explore the role of topic contingency and facilitative techniques in improving the topic contingent responses of children with ASD. Case series was selected for this study because data from the dyads of this study could only be collected after the commencement of the RC intervention programme. As the initial sessions of the RC programme are aimed at familiarising the participants with the structure of the programme and the therapists, and to obtain consent from the families to participate in this study, the investigator could not be included in those sessions. So, instead of obtaining baseline data prior to the commencement of this programme, the dyad's conversational baseline skills were obtained in an initial assessment session, after the dyads had familiarised themselves with the programme setting. After the initial assessment session, the dyads' conversations were observed every 3 weeks until the dyad's completion of the RC programme and in two follow-up sessions after intervention.

While Portney & Watkins (2000) argued that a case study inherently lacks control and generalisability, the validity of case studies can be elevated by including all possible factors in making conclusions, making accurate inferences, and by replicating the study (Yin, 2009). In this study, the following steps were taken to enhance the validity of the findings: (i) using

repeated measurements of multiple outcome measures in the domain of conversation and language; (ii) including a follow-up phase after intervention; (iii) replicating the procedure with the third caregiver-child dyad over a longer period of time; and, (iv) supporting the intervention outcomes with sound theoretical approaches and data documented in the literature.

4.2.2 Participants

Three caregiver-child dyads were recruited from the RC programme at the Champion Centre. The dyads were selected because the children (i) were between the chronological age of two to six years old, (ii) had been given the provisional diagnosis of ASD, (iii) were identified as having conversational difficulties by their attending speech-language therapist (SLT) at the centre (iv) were not participating concurrently in other intensive behavioural intervention, (v) did not have any visual or hearing impairment, and (vi) were native speakers of English.

Table 4.1 summarizes the demographic information of the children and caregivers who participated in this study. The children ranged in age from 2;8 to 3;7 years old at the start of the study, and were all males. All three children had been receiving intervention at the centre immediately after the diagnosis was made by their paediatricians. One of the children (Child F) presented with a standard score that was 1.5 SDs below the sample mean on the Preschool Language Scale - Fourth Edition (PLS-4; Zimmerman, et al., 2002); one of them (Child G) presented with a standard score that was two SDs below the sample mean; and another one (Child E) presented with a standard score that was three SDs below the sample mean. All main caregivers in this study were the mothers of the children. The caregivers ranged in age from 33;9 to 41;11 years old at baseline. Two caregivers had completed tertiary education while one completed a post-secondary education. All children were raised in two-parent families. One caregiver was employed outside the home on a part-time basis and two were full time caregivers. All fathers were involved in their children's care and they were all employed full-time.

Table 4.1 Demographic information of the children and their caregivers

Participants	Child E	Child F	Child G
Age at baseline	3;4	3;7	2;8
Gender	Male	Male	Male
Age at entry into intervention at the Champion Centre	2;8	3;4	2;1
PLS-4 standard scores	50 (-3SD)	76 (-1.5SD)	57 (-2SD)
Caregiver's status	Mother	Mother	Mother
Caregiver's age at initial assessment	33;9	41;11	40;2
Caregiver's education level	Post secondary	Tertiary	Tertiary
Caregiver's employment status	Full time homemaker	Part time employee	Full time homemaker

4.2.3 Procedure

Data for analysis were obtained from conversations between the caregivers and their children at their homes. The study commenced with a concurrent observation of Dyads E and F for 7 months. This was then followed by a replication of the observational methods with Dyad G for 12 months. Conversational data of Dyad G were also collected from a PlayCentre[1] that the child and caregiver attend regularly. This setting was included because the caregiver reported that a large proportion of their dyadic interactions also take place at the PlayCentre. The conversations were video-recorded using a Panasonic digital video camera, model SDR-H250GN-S and then transferred into digital files for analysis.

[1] PlayCentres in New Zealand are run co-operatively by local family members and supported by the PlayCentre Federation (http://www.playcentre.org.nz/about_us.php).The aims of the PlayCentres include promoting caregiver-child interactions by providing a safe and secure learning environment for children and their caregivers. They also offer parenting education to caregivers and provide publications and resources related to parenting skills to the caregivers. A typical PlayCentre session involves children from birth to six years old playing with each other and with their caregivers.

Before video-recording started, the caregivers were asked to interact with their children as they normally would if there was no observer in their immediate conversational environment. They were asked to either play or take part in a routine with their children, for about 22 to 25 minutes. No restrictions were given regarding play or position of the participants in their play location (i.e., their homes and/or PlayCentre for Dyad G). If they chose to engage in free play, they could use their own toys or toys provided by the investigator. The toys provided by the investigator were similar to those owned by the families or used in the intervention sessions, to help them ease into their play quickly. Examples of toys were a tea-set, trains, a set of other toy vehicles and posting toys. Recording was discontinued if the child began to cry or fuss and could not be re-engaged.

This study took place in three phases: (i) initial assessment phase; (ii) intervention phase (iii) and follow-up phase. One video-recording was obtained during the initial assessment phase. Seven video recordings were obtained during the intervention phase. In the follow-up phase, two video-recordings were obtained. Altogether, ten conversational language samples were recorded from each dyad. This recording protocol was used in all sessions throughout all three phases. In addition to the protocol described here, as noted earlier, the PLS-4, was administered at the time of the initial assessment, at the children's homes.

(i) Initial assessment phase

The initial assessment phase was used in part as a pre-intervention data point and in part to familiarise the caregiver and child with the procedure involved. Only one pre-intervention data point could be obtained for each outcome measure because of constraints from the clinical set-up of the RC programme. Therefore, although one pre-intervention measure was taken, as it is only a single data point, it could not be used as a judgement of baseline performance.

(ii) Intervention phase

The intervention programme consisted of weekly sessions delivered by the Champion Centre's therapists. For Child E and Child F, intervention was made up of

18 sessions over the span of four to five months, with a two week break after the first nine weeks of intervention. For Child G, intervention was made up of 28 sessions over a span of six to seven months, with a five week break after the first nine weeks of intervention, and another two week break after the next ten weeks of intervention. These breaks corresponded with the school holidays in New Zealand. In addition to these sessions, meetings between the therapists and each caregiver to discuss their children's Individual Plans for intervention and their children's progress in their immediate surroundings such as home and preschool were conducted. The caregivers attended all the intervention sessions with their children. Altogether, Dyad E attended 95.0% of their scheduled intervention sessions, Dyad F attended 100.0% of their scheduled sessions, and Dyad G attended 93.55% of their scheduled intervention sessions.

The multidisciplinary team members of the RC programme met with the family of the child prior to the commencement of the study, between intervention sessions and at the end of intervention to discuss family concerns, child's progress and intervention plans. The team also had weekly meetings to review the session of that week and to plan for the next session. Intervention sessions were conducted in a room equipped with minimal stimulus fixtures such as dimmer lights, hindrance from distractions from other activities outside the room and containing intervention items for only the current activity the therapists were conducting (The Champion Centre, 2005). When there was a change in activity, the therapists would quickly remove the items that had been used and bring in items for the next activity while ensuring that the activities flowed from one to the other. In addition, puppets and/or soft toys were sometimes used in the session to help the child to become more forthcoming when interacting with the therapists.

The structure of each session was constant across all sessions of the programme, with variations in the level of task implementation and expectations. These variations were specific to each caregiver-child dyad's needs and the child's level of communication. Each session involved the caregiver and child, the occupational therapist and the SLT; and could involve a psychologist and a music specialist. Each session lasted between 40 and 50 minutes and consisted of a few types of physical activities that were aimed at *promoting joint attention, social-emotional regulation and turn-taking* between the caregiver and child (Tatterson, et

al., 2011). These activities were repeated as routines in the children's intervention sessions, and small variations were introduced to the activities once the children were familiar with them. In these activities, conversational topic turns and techniques that facilitated conversational development such as waiting and making follow-in comments were modelled and explained to the caregiver. Concurrently, the SLT would suggest specific strategies that help the caregivers to follow their child's lead as the caregivers interacted with their children (e.g., imitation, expansion, waiting, establishing eye contact with the child). The therapists would explain to the caregivers the aims and benefits of conducting these activities in the sessions.

The sessions began with a singing activity led by a music specialist/therapist. The clinical psychologist, occupational therapist and SLT were also present in this activity. In the activities that followed, the music specialist/therapist and clinical psychologist would leave the room leaving the child and the child's caregiver(s) with the SLT and occupational therapist. Then the therapists would conduct activities aimed at improving the child's proprioceptive system and for sensory integration (Tatterson, et al., 2011), such as moving the child's limbs on the floor or on a gym ball, or gentle swinging in different types of swings; improving the child's gross and fine motor skills such as bouncing on the trampoline, going down the slide, walking on steps, walking on a horizontal beam. Finally, the child would meet the music specialist/therapist for a music session that involved different musical instruments. At the end of each session, the therapists would review the session and discuss any concerns raised by the caregivers. While conducting these activities, the therapists adhered to the core focus of the programme (i.e., joint attention, social-emotional development and turn-taking between the caregiver and child). Appendix E summarises the description of the RC programme.

During the weeks that the dyads were attending intervention, the recordings of their conversational interactions were made at three week intervals in naturalistic settings.

(iii) Follow-up phase

The follow-up measurements were taken at the completion of the intervention programme. The first follow-up session was conducted two weeks following intervention. The second follow up occurred two months after the completion of the intervention programme. In each follow-up, conversational data were collected using the procedure employed during the initial assessment and intervention period.

4.2.4 Transcription and coding of caregiver-child conversations

For each session, transcription of conversations was carried out for the middle 20 minutes of each video-recording. The procedure for data transcription and data coding follows that described in Chapter 2. The transcripts were coded for the caregivers and children's conversational topic turns and caregivers' use of facilitative techniques.

4.2.5 Outcome measures

Each transcript was examined for change in the (i) caregivers and the children's verbal conversational topic turns; and (ii) caregivers' use of facilitative techniques. Outcomes for conversational topic turns were the rates of topic changes (TC) per minute, rates of topic extensions (TEs) per minute, and rates of topic maintaining responses (TMs) per minute. Outcome measures for caregiver's facilitative techniques were rates of imitations per minute, rates of expansions per minute, rates of follow-in questions per minute, and rates of follow-in cloze procedures per minute. The use of rates per minute followed the method used by Girolametto et al. (2007).

4.3 Reliability

4.3.1 Fidelity of treatment

Fidelity of treatment was assessed in 10% of the intervention sessions that Dyads E, F and G attended. These sessions were randomly selected and treatment fidelity was assessed for ten criteria: (i) structure of the sessions (i.e., multidisciplinary team, setting and provision of routines); (ii) focus of the sessions (i.e., joint attention, social-emotional development and

turn-taking in caregiver-child interactions); and (iii) activities of the sessions (i.e., singing, proprioceptive and sensory integration, gross and fine motor, and music). Fidelity of treatment implementation was considered achieved if each of the criteria were implemented with at least 85% accuracy. The observer was an SLT and a postgraduate student in speech-language therapy. The observer was blind to the intervention programme and had no previous exposure to the RC programme. Treatment fidelity was 98.77% (*SD*=3.70) for structure of the session; 86.11% (*SD*=13.17) for focus of the session; and 88.89% (*SD*=13.18) for activities of the session. An example of the form used for establishing treatment fidelity is shown in Appendix F.

4.3.2 Transcription and coding reliability

Adherence of transcripts to the CHAT conventions was done using the automatic facilities of the CHILDES system and adherence to the coding convention was done using software designed for this purpose. 56.67% of the total transcripts were verified for content reliability by another transcriber and 20% out of the total transcripts were verified for coding reliability by another coder. Verification was done as they read the transcripts or codes while watching the videos (Girolametto, et al., 2007; Johnston, 2001). Disagreements were noted and resolved through discussions with the original transcriber. Amendments were then made on the transcripts. Consensus reliability was conducted on the transcripts before any corrections were made, using the formula: number of agreements/(the number of agreements + disagreements) X 100. Consensus reliability for transcription of the caregivers' utterances was 98.23% (*N*=5758) and child utterances was 99.21% (*N*=3548). Consensus reliability for the coding of the caregivers' conversational codes was 98.95% (*N*=1899); caregivers' facilitative techniques was 89.68% (*N*=310); and the coding of the children's conversational codes was 99.14% (*N*=1506). Finally, the same coder also independently coded three randomly selected transcripts and for these transcripts, consensus reliability for the caregivers' conversational codes was 80.35% (*N*=402); caregivers' facilitative techniques was 93.60% (*N*=82); and the coding of the children's conversational codes was 90.74% (*N*=451).

4.4 Results

This section provides a description of the intervention outcomes of three caregiver-child conversations following the RC intervention programme. Following the presentation of those results, individual variations for each dyad are compared. Results were analysed using trend analysis. This approach can be used to identify the most reasonable description of continuous data based on the number of topic turns, or "ups and downs" seen across the levels of the independent variable (Portney & Watkins, 2000). The results are interpreted and discussed in relation to the single pre-intervention data point obtained for each outcome measure.

4.4.1 Dyad E

Caregiver E's concern for Child E was his social-communicative skills, sensitivity with food textures, sleeping difficulties and bowel discomfort. She reported that Child E was undergoing medical examinations for allergy when the study was being conducted. Child E was 3;4 years old at entry into this study. At the initial assessment session, Child E was interested mainly in play activities using mechanical toys (e.g., stacking the blocks and watching the toy train move). During these play activities, his attention appeared mostly fixated on the toys. Most of the time, it was noticed that he shifted his attention to Caregiver E and initiated conversational topic turns only when he needed assistance from Caregiver E. His conversational topic turns consisted of single words, non-verbal behaviours (e.g., taking the adult's hand) and unintelligible utterances. Occasionally, he would engage in continuous reciprocal play with Caregiver E (e.g., pointing at each other's noses). The therapists of the RC programme reported that their specific intervention goals for Dyad E included improving Child E's joint attention, symbolic aspects of communication, sensory sensitivity, motor coordination and regulation of his emotions.

Towards the end of intervention phase (session five to seven), Caregiver E reported that Child E's interests in play activities had changed to enacting scenarios from his favourite cartoons such as "Little People" and taking turns when rolling or passing the ball. It was observed that Child E was able to reciprocate Caregiver E's topic turns in conversations and coordinate his attention between the toys and Caregiver E. In addition, he was also imitating Caregiver E's topic turns and producing echolalic utterances from his favourite stories.

Caregiver's rates of conversational topic turns

The three conversational topic turns measured were TC, TE and TM and Figure 4.1 displays the rates of these topic turns for Dyad E. Results shows high variability in Caregiver E's production of TCs but trend analysis reveals stable rates of TCs in the intervention phase. Noticeable increases in TCs were observed in the follow-up phase. Caregiver E's rates of TEs in the intervention and follow-up phases were higher than at initial assessment. However, there was no discernable change in Caregiver E's rates of TEs in the intervention and follow-up phases. Even though Caregiver E's rates of TMs following intervention were lower than at initial assessment, trend analysis revealed a general increase in TMs during intervention, with a dip in the fifth intervention time point. Post-intervention, Caregiver E's use of TMs appeared lower than the rates produced in the last two intervention time points.

Caregiver's rate of facilitative techniques

The facilitative techniques measured were imitation, expansion, follow-in questions, and follow-in cloze procedures. These techniques were measured in rates per minute. Table 4.2 displays the rates of all caregivers' facilitative techniques across time.

Across all four techniques, Caregiver E's initial assessment measurement consisted of the highest proportion of imitations. This was followed in sequence by follow-in questions, and then expansions. No instances of follow-in cloze procedure were observed at initial assessment. Throughout intervention, Caregiver E's use of imitation continued to increase and it remained as the most commonly used technique in this phase. The increase in rates of imitation was maintained in the first follow-up session but in the second follow-up, the use of imitation decreased. Another technique that was used increasingly was expansion and the increase in the rates of expansion was maintained in the follow-up phase. There was considerable variability in the use of follow-in questions in the intervention phase as the rates were both lower and higher than the initial assessment across the intervention time points. This high variability remained in the follow-up phase with an absence of follow-in questions in the second follow-up. Most notably, Caregiver E did begin to use cloze procedures at the beginning of the intervention phase but a noticeable decrease was observed towards the end of intervention and in the follow-up phase. Caregiver E's rates of follow-in cloze procedures

was the lowest among all techniques in both intervention and follow-up phases. However unlike at initial assessment, they were being employed to some degree.

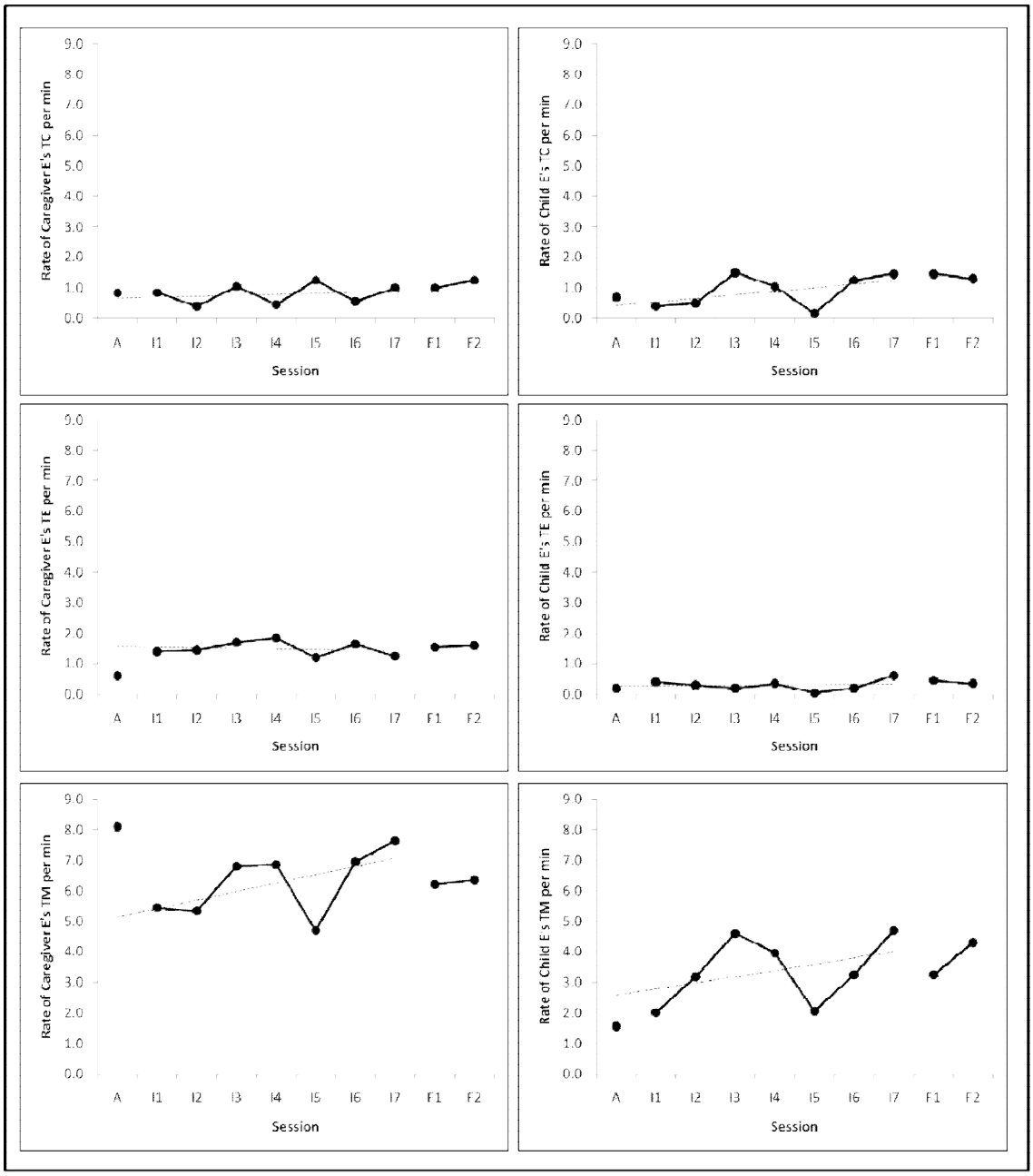

Figure 4.1 Rates of topic change (TC), topic extension (TE) and topic maintaining response (TM) produced by Dyad E

Note. A=Initial assessment; I=intervention; F=follow-up; broken horizontal line=trend analysis of data from the intervention phase.

Table 4.2 Rates of caregivers' facilitative techniques across time

Caregiver	Facilitative techniques	A	I1	I2	I3	I4	I5	I6	I7	F1	F2
E	Imitation	1.20	1.35	1.60	1.85	1.80	0.80	1.45	2.60	2.00	1.30
	Expansion	0.45	0.40	0.95	1.20	1.30	0.55	1.55	1.30	1.15	1.55
	Follow-in questions	0.90	0.70	0.55	1.10	0.55	1.45	0.95	1.20	0.75	0.00
	Follow-in cloze procedure	0.00	0.25	0.05	1.10	0.45	0.15	0.45	0.15	0.10	0.15
F	Imitation	0.65	0.40	0.40	0.45	0.40	0.65	0.50	0.70	0.45	1.05
	Expansion	1.35	0.80	1.80	1.65	0.45	1.00	1.75	1.20	0.85	0.75
	Follow-in questions	1.45	1.90	0.80	1.70	0.50	1.75	1.45	1.50	1.20	1.55
	Follow-in cloze procedure	0.00	0.00	0.05	0.35	0.10	0.10	0.00	0.05	0.20	0.10
G	Imitation	0.05	0.65	0.65	0.40	0.20	0.20	0.65	0.55	0.35	0.30
	Expansion	0.15	0.35	0.85	0.45	0.15	0.40	0.55	0.40	0.75	0.35
	Follow-in questions	0.05	0.85	0.55	0.45	0.90	0.60	0.95	0.95	1.15	0.65
	Follow-in cloze procedure	0.00	0.15	0.00	0.05	0.15	0.00	0.35	0.05	0.10	0.05

Note. A=initial assessment; I=intervention; F=follow-up.

Child's rates of conversational topic turns

As shown in Figure 4.1, Child E showed substantial variability in the production of TCs and TEs across time. Although his rates of TCs in the intervention phase were lower than the initial assessment rate, trend analysis indicates a horizontal slope, suggesting a stable production of TCs during the intervention phase. Child E's rates of TEs following intervention were generally higher than the initial assessment rate. However in the intervention phase, there appear to be no discernable change in Child E's rates of TEs. Finally, Child E's rates of TMs following intervention were higher than the initial assessment rate. However, there was a decrease in TM production after the third intervention time point and then an increase in the rates of TMs in the last two intervention time points. The rates of Child E's TMs in the follow-up phase appeared to be within the range of TMs produced in the intervention phase.

4.4.2 Dyad F

At the initial assessment session, Caregiver F reported concern for Child F's difficulties in accommodating other people's intentions in interactions and his selective food preferences. It was observed that Child F was able to engage in pretend play such as tea parties and enacting scenarios from familiar stories such as "Bob the Builder". Child F produced conversational topic turns with multiword utterances and demonstrated reciprocal interaction with Caregiver F while playing. However, it was noticed that Child F tended to persist on only a few selected items when playing and would appear apprehensive when Caregiver E tried to introduce a new item or variation in the flow of their play. The RC therapists reported that Dyad F's intervention goals included decreasing Caregiver F's rates of directiveness and turn complexity (e.g., number of utterances in a turn) to allow more turn opportunities for Child F; and improving Child F's joint attentional skills, sensory sensitivity, motor skills and regulation of emotions.

Towards the end of intervention, Caregiver F reported that Child F showed flexibility in his interactions and had less moments of distress when he did not agree with his conversational partner's intentions. In addition, Caregiver F also reported that Child F had gained more understanding of abstract concepts such as "more than" after attending intervention.

Caregiver's rates of conversational topic turns

Figure 4.2 displays the rates of TCs, TEs and TMs by Dyad F. Results show that Caregiver F's proportion of TCs was the lowest and the proportion of TMs was the highest among the three types of conversational topic turns in all three phases. In the intervention phase, the rates of TCs appeared lower than the rate of TC at initial assessment. Trend analysis reveals a slight decrease in TCs in the intervention phase. In the follow-up phase, Caregiver F's TCs remain within the range of TC rates produced in the intervention phase. Concurrently, Caregiver F's use of TEs and TMs appeared stable across initial assessment, and intervention and follow-up.

Caregiver's rate of facilitative techniques

As shown in Table 4.2, changes were observed in Caregiver F's production of facilitative techniques. At initial assessment, Caregiver F used follow-in questions to a greater extent than other facilitative techniques. This was followed in sequence by expansion, and then imitation. Follow-in cloze procedures were not used.

In early intervention, Caregiver F showed increased rates of follow-in questions and expansions. However, at the end of intervention and in the follow-up phase, the rates of follow-in questions decreased to about the same as the rate produced at initial assessment. Increase in the rates of expansions remained throughout the intervention phase but in the follow-up phase, the rates of expansions were lower than the initial assessment rate. Caregiver F's use of imitation remained rather constant during intervention but there was an increase in the rate of imitation at the second follow-up session. Caregiver F began to produce follow-in cloze procedures in the intervention phase but the rates of follow-in cloze procedures remained low throughout intervention and follow-up.

Child's rates of conversational topic turn

As shown in Figure 4.2, in the intervention phase, Child F demonstrated higher rates of TCs and TMs than their initial assessment rates. Trend analysis for TCs and TMs in the intervention phase reveals a gradual ascending slope, suggesting gradual increases in Child F's use of these two topic turns. However, high variability in TC data points was noticed. In

the follow-up phase, the rates of TCs and TMs were within the range of rates of TCs and TMs produced in the intervention phase. Finally, there was no discernable change in Child E's use of TE across all phases.

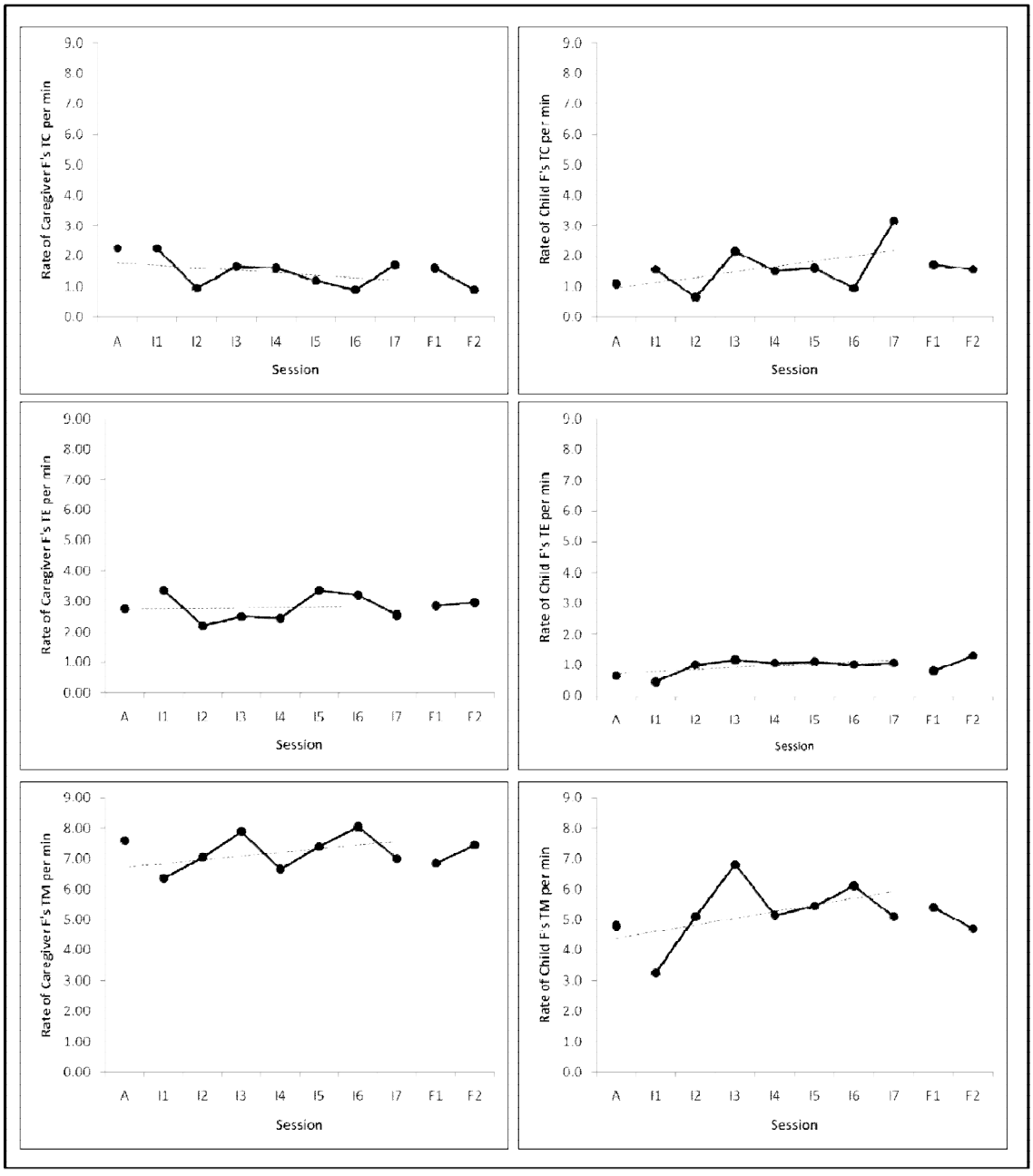

Figure 4.2 Rates of topic change (TC), topic extension (TE) and topic maintaining response (TM) produced by Dyad F

Note. A=initial assessment; I=intervention; F=follow-up; broken horizontal line=trend analysis of data from the intervention phase.

4.4.3 Dyad G

In the initial assessment session, Caregiver G expressed concerned about Child G's delayed expressive language skills. In this phase, it was observed that Child G enjoyed fine-motor activities (e.g., pouring water and turning the tap) and would seek Caregiver G's attention and requested for her assistance through single words, vocalisations and non-verbal behaviours (e.g., pointing). Although Child G engaged in reciprocal interactions with Caregiver G, it appeared that he maintained conversational topics mainly by repeating the same phrase or repeating a particular act (e.g., turning the tap on and off several times or keep filling a pail with water) until Caregiver G introduced a new focus of attention in their interactions. For Dyad G, the therapists of the RC programme reported that their intervention goals included decreasing Caregiver G's directives and increasing Caregiver G's joint attention with Child G; and improving Child G's joint attentional skills, motor skills, sensory skills and regulation of emotions.

Towards the end of intervention, Caregiver G reported that Child G's communicative intentions and vocabulary had increased. He was able to engage in functional play (e.g., playing with toy farm and animals) and produced topic turns with a variety of words. It was also observed that Child G could initiate topic turns to expand his current focus of attention (e.g., putting the toy hay on a toy truck, moved the truck to the farm, then fed the cows with the hay).

Caregiver's rates of conversational topic turns

Figure 4.3 displays the rates of TCs, TEs and TMs by dyad G. Examination of the conversational data of Dyad G showed that although the rates of TCs and TMs were higher and TEs were lower than their initial assessment rates, trend analysis reveals a lack of discernable changes in Caregiver G's use of all three topic turns across the intervention and follow-up phases.

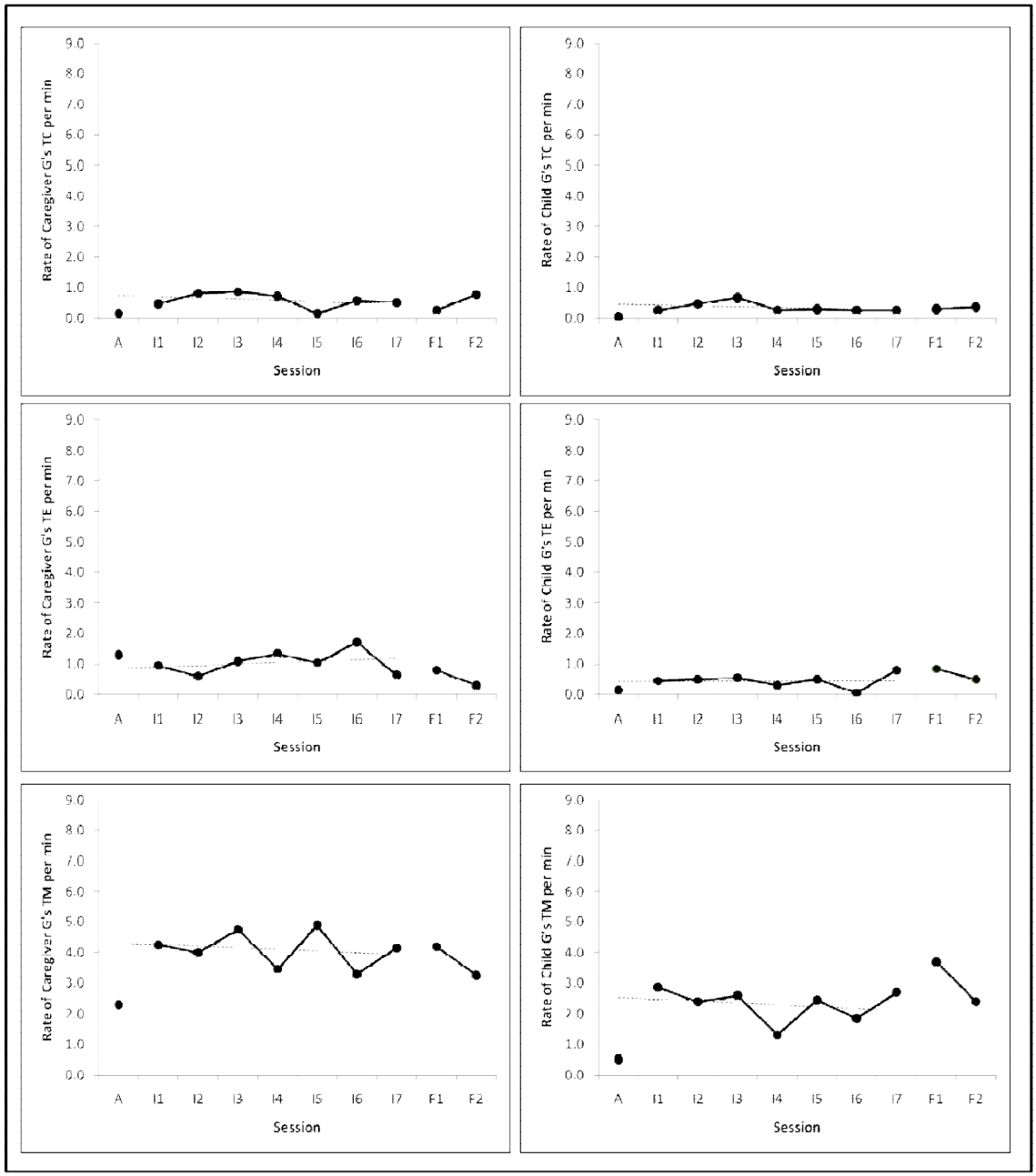

Figure 4.3 Rates of topic change (TC), topic extension (TE) and topic maintaining response (TM) produced by Dyad G

Note. A=initial assessment; I=intervention; F=follow-up; broken horizontal line=trend analysis of data from the intervention phase.

Caregiver's rate of facilitative techniques

Of all caregivers, Caregiver G displayed the lowest rates of facilitative techniques in conversations. Nevertheless, changes in use of facilitative techniques across time were observed. At initial assessment, Caregiver G used expansion the most. This was followed by imitation and follow-in questions. As observed with the other dyads, there was no production of cloze procedure at initial assessment. Throughout intervention, there was an increase in use of all four facilitative techniques. At the latter half of the intervention phase, however, follow-in questions was the most commonly used technique although the others were evidenced. Follow-in questions remained the most commonly used technique in the follow-up phase. Follow-in cloze procedure was used the least in all three phases. In the follow-up phase, the rates of these techniques decreased but were still higher than the initial assessment rates. During follow-up, follow-in questions remained as the most commonly used technique. This was followed in sequence by expansion, imitation and follow-in cloze procedure.

Child's rates of conversational topic turn

Similar to Caregiver G, Child G showed relatively no discernable changes in the production of TCs, TEs, and TMs in the intervention phase, although the rates of TEs and TMs appeared higher than their initial assessment rates.

4.4.4 Individual profiles

Table 4.4 summarises the noticeable changes observed in each caregiver and child. As expected, considerable variations are noticed in the caregiver and child outcome measures.

The observed changes in Dyad E suggest that following intervention, Caregiver E improved the contingency of topic turns by being more facilitative with higher TMs. However Caregiver E's use of TCs and TMs did not conform to the expected change. Concurrently Caregiver E was using higher rates of imitations and expansions. At the same time, Child E increased participation in their conversations by increasing production of TCs and TMs.

Conversational data of Dyad F suggest that Caregiver F's changes in contingency were achieved through decreased rates of TCs. Additionally, Caregiver F also increased the

use of follow-in questions and expansions. Concurrently, Child F exhibited an increase in the rates of TCs and TMs.

Finally, the observed changes in Caregiver G's and Child C's topic turns did not conform to the expected changes. There were no discernable changes in their rates of TCs, TEs and TMs. However, Caregiver G exhibited improvement in production rates of three facilitative techniques i.e., imitation, expansion and follow-in wh-questions.

Table 4.4 Summary of the changes observed in each caregiver and child

	Conversational topic turn			Facilitative technique			
	TC	TE	TM	IMI	EXP	WHQ	CPR
Caregiver E	–	–	√	√	√	–	–
Child E	√	–	√	NA	NA	NA	NA
Caregiver F	√	–	–	–	√	√	–
Child F	√	–	√	NA	NA	NA	NA
Caregiver G	–	–	–	√	√	√	–
Child G	–	–	–	NA	NA	NA	NA

Note. TC=topic change; TE=topic extension; TM=topic maintaining response; IMI=imitation; EXP=expansion; WHQ=follow-in question; CPR=follow-in cloze procedure; √=positive changes; X=negative changes; –=stable rates; NA=not applicable.

4.5 Discussion

The purpose of this study was to investigate the change towards contingency in conversational topic turns through conversational topics and facilitative techniques, between caregivers and their children with ASD following the RC programme. Specifically, four research questions were raised: (i) "Does the caregivers' use of conversational topic turns change following intervention?" (ii) "Does the caregivers' use of facilitative techniques change following intervention?" (iii) "Does the children's use of conversational topic turns change following their caregivers' participation in intervention?" and (iv) "What are the individual variations among the participants of this study?"

In order to answer the first three questions, the outcome measures of this study were rates of conversational topic turns (i.e., TC, TE and TM) and the caregivers' rates of facilitative techniques (i.e., imitation, expansion, follow-in questions and follow-in cloze procedures). Consistent with findings of past studies, it was expected that the caregivers would exhibit less directiveness in conversations through lower rates of TCs and better topic contingency through higher rates of TEs and TMs, accompanied by better child assertiveness through higher rates of TCs and TEs and better responsiveness as well as topic contingency through higher rates of TEs and TMs (Fey, 1986; Mahoney & Perales, 2005; McConachie, et al., 2005). Finally, an increase in the use of facilitative techniques was predicted (Girolametto, et al., 1996; Girolametto, et al., 2007; McConachie, et al., 2005). Data analysis reveals that parts of the findings conformed to expectation, however, individual variations across outcomes were noted. The findings of this study suggest that for children with ASD, an intervention programme that focuses on improving both their joint attentional and communication skills in caregiver-child interactions, advances their conversational skills. This is consistent with other intervention studies that reported concurrent improvement in these children's joint attentional and social-interactions skills (Aldred, et al., 2004; Girolametto, et al., 2007; Mahoney & Perales, 2003, 2005; Yoder & McDuffie, 2008).

Specifically, improvement in TC was observed in one caregiver and one child. The caregiver produced lower rates of TCs following intervention, suggesting a probable indication of less directiveness. Concurrently, the child exhibited increased rates of TCs and TMs suggesting a probable indication of better assertiveness and responsiveness. In the production of contingent topic turns, one caregiver appeared as being more responsive through the use of higher rates of TMs following intervention. Concurrently, this caregiver's child also appeared as being more responsive through higher rates of TMs, as well as assertive through higher rates of TCs following intervention. While the children here were expected to make changes that were similar to the children whose caregivers participated in the ITTT programme (Study 1), surprisingly, none of them showed discernable changes in their use of TEs. One possible reason for this lack can be attributed to the lack of change in their caregivers' use of TEs. Collectively, the positive changes shown by these caregivers support the idea that intervention programmes that promote reciprocal joint attention help caregivers to increase their moments of shared joint attention with their children instead of redirecting their children's focus of attention to a new one (Schertz & Odom, 2004). It is suggested that the decrease in the non-contingent TCs by the caregiver reduced processing

workload for the child (McCarthren, et al., 1995; Sperber & Wilson, 1995; Tomasello & Farrar, 1986). Concomitantly, the improvements in the rates of TMs by the caregivers also indicate lighter cognitive processing of these topic turns by the children (McCarthren, et al., 1995; K. E. Nelson, 1989; Sperber & Wilson, 1995; Tomasello & Farrar, 1986). While the content of TM is restricted within the boundaries of the focus of the conversational topic, it is argued that the use of TE would be appropriate to broaden the scope and content of the conversational topic in a contingent manner. Although high rates of TCs have been reported as one of the conversational difficulties faced by children with features of ASD (Rapin & Dunn, 2003; J. E. Roberts, Martin, et al., 2007), the children in this study presented with lower rates of TCs than TEs and TMs during intervention. Therefore, the increase in the production of TC reflects an increase in the children's assertiveness in conversations (Fey, 1986). However, an increase in the children's TCs also reflects an increase in the use of non-contingent topic turns, and therefore, it is necessary to include the children's change in TEs and TMs in the analysis too. The increases in the rates of child TMs indicate that the children improved in producing conversational topic turns relevant to the conversational context.

Similar to findings of Study 1 (ITTT, Chapter 3), although the caregivers did not show substantial improvements in the rates of their conversational topic turns, they demonstrated higher consistency in the increase of their use of facilitative techniques following intervention. Improvement in the rates of imitation was observed in two caregivers, improvement in the rates of expansions was observed in all caregivers and improvement in the rates of follow-in questions were observed in two caregivers. The rates of follow-in cloze procedures produced by the caregivers remained the lowest among all four techniques across all time points. Like the findings of Study 1 (ITTT), the findings of this study suggest that the RC intervention programme helped the caregivers to increase the quality of their conversational topic turns through increases in rates of facilitative techniques. While all of the four techniques investigated here have been reported to be positively associated with several aspects of language skills such as vocabulary, multiword utterances, semantics and syntax (Bellon-Harn, et al., 2004; Bradshaw, et al., 1998; Girolametto, et al., 1999; Masur & Olson, 2008; McDuffie & Yoder, 2010; Scherer & Olswang, 1984; Yoder, Davies, et al., 1994), the findings of this study highlight that these techniques also have the potential of improving children's pragmatic skills in the form of conversational contingency (e.g., TE and TM) and assertiveness (e.g., TC). This argument is supported by findings of other studies which showed that these techniques improved children's contingent responses (Yoder &

Davies, 1990; Yoder, Davies, et al., 1994) and other pragmatic skills such as acquisition of displacement topics (Ornstein, et al., 2004; C. Peterson & McCabe, 1994; Ratner, 1984; Tamis-LeMonda, et al., 2001) and imitation (Scherer & Olswang, 1984).

In this study, although all caregivers exhibited an increase in their use of cloze procedures, this technique was the least used technique. While the benefits of cloze procedure in conversations have not been widely reported in the literature, cloze procedures in book reading routines have been reported to be positively associated with the development of contingent turns and other language skills such as semantics and syntax (Bellon-Harn, et al., 2004). In this study, one possibility for the low rates of follow-in cloze procedures may be the lack of highlight of this technique in the intervention programme. The analysis of the caregivers' facilitative techniques and the children's contingent topic turns suggest that the effectiveness of these different techniques warrants further exploration.

Finally, following the last research question of this study, individual variability observed in the data of this study may be attributed to the complex interaction of various personal, developmental and contextual factors (Bornstein, et al., 2007; Carter et al., 2011; Drake, et al., 2007; Huttenlocher, et al., 2007; Pancsofar, et al., 2008). In this study, Child F presented with higher language skills than Child E and Child G. Child F's standard score on the PLS-4 was 1.5 SDs below the sample mean whereas Child E and G's standard scores on the PLS-4 were three and two SDs below the sample mean, respectively. The differences in their language levels and range of ASD symptoms might have contributed to the differences in their responsiveness in the caregiver-child conversations recorded for this study. In addition, the rates of topic turns produced by Dyad G appear to suggest that a lack of change in caregivers' topic turns may possibly reduce the facilitative effects of caregivers' conversational input. Therefore, it is argued that positive changes in caregivers' use of topic turns are more likely to facilitate change in children's conversational contingency than neutral or negative changes in caregivers' topic turns. Despite the differences in the changes shown by Caregiver E and F, their children's improvement appeared rather constant, both increased their use of TCs and TMs, indicating a probable improvement in assertiveness and responsiveness following intervention. Their improvement may be facilitated by the interaction of the positive changes in their caregivers' conversational and facilitative techniques. Therefore, individual variability may be a result of the dynamic interactions between the caregivers' and the children's outcome measures. The changes across caregivers may be affected by the changes in their children's outcome measures, and vice-versa,

variability across children may be affected by the changes exhibited by their caregivers (Bohannon & Bonvillian, 2009; Sameroff, 2009).

4.6 Clinical implications

The findings of this study support the effectiveness of intervention programmes that focus on improving children's joint-attentional skills via interactions with their caregivers, and an indirect teaching of communication strategies to help children with ASD to improve their conversational skills. It is suggested that the use of TCs, TEs and TMs is highlighted to caregivers in intervention sessions to increase their awareness of the use of these topic turns in scaffolding their children's conversational skills. As the caregivers in this study used low rates of follow-in cloze procedures in the intervention and follow-up phases, it is suggested that this technique is also modelled to the caregivers, in the intervention sessions, as it has potentials to elicit child contingent responses (Beresford, 1994; Bradshaw, et al., 1998) because of its high relevance with the child's preceding conversational topic turn and prompting component. The findings of this study reveal that the production of conversational topic turns is highly variable across individuals. Therefore, when evaluating caregivers' and children's conversational skills, aspects that have been shown to potentially influence this variability (e.g., caregiver and child personal factors, conversational environment, etc.) should be included in the analysis, as recommended in the best practise of family family-focused intervention programmes (Bailey, et al., 1986).

4.7 Limitations and directions for future research

This study employed a case series method to analyse the change in caregivers and children's conversational skills across time. As this study collected only one language sample prior to intervention, it is difficult to determine whether some of the changes were due to maturation. Collection of several baseline measures allows the researcher to examine trends that may be evident prior to the commencement of intervention. For instance, a greater number of data points prior to intervention may allow for better control of maturation effects. Because case studies do not allow investigations of causal relationships between outcomes,

(Portney & Watkins, 2000), generalisability calls for an extension of the outcomes with experimental studies, and all findings should be interpreted with caution. Subsequent analysis of the relationship between the caregiver-child adjacent turns may provide greater understanding of the immediate effect of the caregivers' conversational topic turns and facilitative techniques on their children's conversational topic turns.

4.8 Conclusion

Intervention that promotes joint attention and affect signalling between caregivers and their children with ASD helps caregivers to achieve higher contingency in their conversational topic turns, which appears to be associated with higher contingency in the children across conversations. While Study 1 (ITTT) and this study (RC; Study 2) reported the rates of conversational topic turns, it is also important that these topic turns are analysed qualitatively. The next chapter reports a study that investigates the quality of conversational topic turns of two children, each respectively from the studies reported in Studies 1 and 2.

CHAPTER 5

STUDY 3

QUALITATIVE CHANGES IN CONVERSATIONAL TOPIC TURNS OF TWO CHILDREN WITH CONVERSATIONAL DIFFICULTIES

5.1 Introduction

In many intervention studies, changes in children's topic manipulation skills are often reported as changes in frequency of particular behaviours (Aldred, et al., 2004; Girolametto, 1988; Girolametto, et al., 2007; McConachie, et al., 2005; McDuffie & Yoder, 2010; Yoder, Davies, et al., 1994). In the studies in Chapters 3 (ITTT) and 4 (RC), the rates of caregiver and child behaviours were reported to examine topic contingency. While rate measures provide valuable information, they do not capture the qualitative changes in behaviours. For these to be captured, micro-analysis of the behaviours in relation to the behaviours of the interlocutor is required. Gardner (2009) stressed that micro level investigations of conversations highlight the children's and caregivers' adaptations to environment and context which provide valuable information related to speech and language therapy and educational practice.

The qualitative aspects of conversational topic turns of typically developing children and children with pragmatic difficulties have been examined in a number of different ways. For instance, children's conversational turns have been described for the purposes of clinical assessment (Willcox & Mogfordbevan, 1995), understanding topic initiation and topic maintenance (Radford & Tarplee, 2000), perseveration of topics in conversations (Stribling, Rae, & Dickerson, 2009) and understanding of adult prompts in conversations (Radford, 2010). However, these studies present cross-sectional data which did not indicate changes across the children's conversational turns. It is suggested that descriptive studies of the changes in children's conversational topic turns provide valuable information on the type of support that can be provided to them during this process. For instance, it is important that we understand how children use conversational topic turns to engage in familiar activities so that

proper scaffolding can be used to help them achieve conversational contingency through these activities.

As reported earlier, conversational contingency can be achieved through contingent topic turns (Fey, 1986) and can be influenced by the activities that children engaged in (Hoff, 2010; Klein, et al., 2010; Ryckebusch & Marcos, 2004). Activities that children perform regularly, such as routines, offer redundant information, familiar scripts, and predictable structure for them to construct their topic turns contingently (Foster, 1986; K. Nelson, 1986; Spagnola & Fiese, 2007; Tomasello, 1988). It is suggested that when a routine is first introduced, a child may first participate with just a few required contributions such as responding to requests and questions, and their caregivers expand these responses to form conversational topics and then extend these topics (Foster, 1986). Routines contain high numbers of contingent responses (e.g., expansions) and prompts (e.g., "who/what is" and "what do/say" questions) that facilitate children's morpho-syntactic development and production of non-imitative utterances (Yoder & Davies, 1992; Yoder, et al., 1995). With repetition, the child might begin to produce similar turns and participate independently or with minimal prompts from their caregivers (Foster, 1986). In comparison to non-routines, Yoder et al. (1992) reported that children use higher rates of words and present with better speech intelligibility in routines.

Past studies have also shown that the type of routines that children engage in, elicit different conversational and language outcomes. For example, it was found that young children produce more declaratives in free play but more requests for information in toy building (Ryckebusch & Marcos, 2004); greater lexical diversity and contingent responses during book reading than in mealtime and toy play (Hoff, 2010); and high proportions of topics related to mental states and feelings during free play and script play (Klein, et al., 2010). In caregiver child conversations, these differences may also be related to the caregiver's models (Klein, et al., 2010) and use of facilitative techniques (Adamson & Bakeman, 2006).

Given the close relationship between conversational topic turns and activities (H. H. Clark, 1992), it is suggested that the type of topic turns that children produced while engaging in an activity may also contribute to how the activities will be proceed or advanced. For instance, contingent topic turns such as topic maintaining responses (TMs) maintain the focus on the activity and therefore, help the child to collaborate on that part of the activity

with the caregiver; topic extensions (TEs) expand the activity by shading the child's focus of attention to another relevant focus of attention, but still within the scope of the activity. Contrary to contingent topic turns, non-contingent topic turns such as topic changes (TCs) may result in a switch of an activity, either to one that the child had previously engaged in, or to one that is completely new.

Therefore, this chapter aims to extend the quantitative analysis reported in Chapter 3 and Chapter 4 by providing a qualitative microanalysis of two children's conversational topic turns in the context of play activities, across time. The children participated in the studies in Chapter 3 (ITTT) and 4 (RC). One child has Down syndrome and the other, autism spectrum disorder (ASD). The children differ in the level of their conversational difficulties, and other characteristics such as clinical aetiology, language level, and the type of intervention programmes that they attended. Given the differences in the children's characteristics, this study explored how conversational topic turns advance the activities that the children participated in. Specifically, it aimed to describe how the children and their parents collaborated and expanded the activities through contingent topic turns; and how they return to a previously engaged activity and propose a new activity through non-contingent topic turns.

5.2 Method

5.2.1 Participants

The two participants for this study were selected from the studies described in Chapters 3 and 4. For ease of presentation, the children will be referred to as Linda and Lucas. Both children presented with significant multi-system developmental delays. Linda presented with a diagnosis of Down syndrome while Lucas presented with a provisional diagnosis of ASD. At the beginning of the study, Linda was aged 2 years 5 months. The Preschool Language Scale - Fourth Edition (PLS-4; Zimmerman, et al., 2002) was administered at that time and she achieved a standard score of 76. Lucas was aged 3 years 7 months and presented with a standard score of 90 on the PLS-4. Table 5.1 outlines their demographic information. Linda was referred for early intervention at birth. During her participation in the study Linda's mother attended the Hanen Programme® for Parents – It Takes Two to Talk™ (ITTT;

Manolson, 1992; Pepper & Weitzman, 2004) for 10 weeks. Data from Linda was collected during the implementation of ITTT (as reported in Chapter 3). Lucas attended intervention at the Champion Centre after receiving the provisional diagnosis of ASD from his paediatrician at around the age of 2;6. He attended the weekly transdiciplinary RC Programme for 20 weeks (as reported in Chapter 4) with his primary caregiver, his mother.

Table 5.1 Demographic information of Linda and Lucas

	Child B	Child D
Age at baseline	2;5 years old	3;8 years old
Gender	Female	Male
Diagnosis	Down syndrome	ASD
PLS-4 standard score at the start of the study	76	90
Type of intervention	ITTT programme complemented by bi-weekly multidisciplinary intervention for the child (including speech-language therapy)	RC multidisciplinary intervention programme
Length of intervention	10 weeks	32 weeks

Note. ITTT=It Takes Two to Talk; RC=Relating and Communicating

5.2.2 Procedure

Video-recordings of caregiver-child conversations of Linda were collected using the procedure described in Chapter 3. Recordings of Lucas were collected using the procedure described in Chapter 4. Transcription and coding of the interactions are described in Chapter 2.

In this study, both children's use of *contingent topic turns* were analysed for: (i) collaboration on an activity; and (ii) expansion of an activity. The children's use of *non-contingent topic turns* were analysed for their (i) return to a previous activity; or (ii) proposal of a new activity. The topic turns were identified on the basis of the conversational topic turn coding described in Chapter 3 and 4. Specifically, the children's conversational data were

scanned and conversational excerpts were extracted according to the manner in which they advance the activities:

(i) Collaboration on a joint activity was indicated by topic maintaining responses (TM).
(ii) Expansion of a joint activity was indicated by topic extensions (TE).
(iii) Returning to a previous joint activity or proposing a new joint activity was indicated by topic changes (TC).

The conversational excerpts were randomly selected within the transcripts of each child. The nature of the analysis and coding was such that this was deemed appropriate to capture the variety of conversational interactions of interest. The conversational topic turns were scanned across time from the baseline phase or initial assessment through to intervention and follow-up phases. This included data from eight number of interactional sessions for Linda and ten interactional sessions for Lucas. The results are reported according to *two* time points because this study aims to investigate changes *before* and *after* intervention commenced. Therefore, baselines are marked as Time 1 (T1) and the intervention and follow-up phases are combined, and marked as Time 2 (T2).

5.3 Results

The results of the conversational data will be presented according to the framework outlined above. Data from each child were compared across two time points, and then compared between the two children. Excerpts of transcripts are presented to demonstrate these changes along with qualitative information about the two children.

5.3.1 Linda

Linda was a cheerful girl in pigtails. She loved playing with her mother, and exploring the toys in the lounge of her home. She was the only child in her family and lived with both of her parents. Just like most children, she was usually shy and guarded every time she was approached for a recording session, but would warm up very quickly and then appear

comfortable playing in front of the video-camera. Linda's gross motor milestones were more delayed than her language skills so she could only crawl from one spot to another. As with most toddlers of her age, Linda also enjoyed asserting independence when interacting with her mother, and preferred to physically manipulate her toys on her own. In the recorded conversations, Linda exhibited several conversational behaviours when collaborating, expanding and switching activities. These behaviours are reported below:

(i) <u>Collaborating on a joint activity</u>

At T1, when collaborating on an activity, Linda exhibited behaviours that have been documented in children with typical development such as vocalisations, imitation, yes/no answers and labelling (Keenan & Schieffelin, 1976; Ninio & Snow, 1996). These behaviours reflected her awareness of turn reciprocation and motivation to maintain the activity with her mother.

One of the strategies that Linda used to collaborate on a joint activity was by responding with vocalisations, accompanied with appropriate body gestures or facial expressions. While her vocalisations did not carry specific information, they appeared as a means to reciprocate her mother's topic turns which subsequently elicited her mother's next topic turns. As shown in Example 5.1, Linda responded to her mother's topic turns with vocalisations (line 2, 5 and 7). In return, her mother responded with minimal linguistic units (line 3 and 4) and imitated her vocalisations (line 6 and 8).

<u>Example 5.1</u> (Linda; T1: 2;5.19)

1	Mother:	Linda eat.	***(Topic: Eating the crackers.)***
2	Linda:	uh [^ looks at MOT].	
3	Mother:	yeah!	
4	Mother:	more chewing?	
5	Linda:	uhoh.	
6	Mother:	uhoh!	
7	Linda:	[^ looks at her plate] oh.	
8	Mother:	oh.	

Another noticeable behaviour that Linda exhibited when collaborating on activities was imitating her mother's topic turns. This strategy was observed throughout all the

recording sessions. An example of it is shown in Example 5.2. Here, she imitated the last word of her mother's utterance.

Example 5.2 (Linda; T1: 2;6.5)

1	Mother:	a woof at the house.	***(Topic: Dog.)***
2	Linda:	house.	

In Example 5.3, she expressed a disagreement with a "no" (line 2), a topic maintaining responses with minimal information, that is, only with information solicited by her mother's preceding topic turn.

Example 5.3 (Linda; T1: 2;6.5)

1	Mother:	want to do that [^ shows her a puzzle]?	***(Topic: A puzzle.)***
2	Linda:	no!	
3	Mother:	no.	

In Example 5.4, she responded to her mother's yes/no question with a "yeah" (line 2).

Example 5.4 (Linda; T1: 2;6.5)

1	Mother:	do you want a book?	***(Topic: Book.)***
2	Linda:	ah yeah.	

At T1, Linda also collaborated on an activity by labelling the items in that activity. In Example 5.5, after shifting the focus of the topic to naming the items of the activity, she proceeded with labelling the next item (line 5).

Example 5.5 (Linda; T1: 2;5.19)

1	Mother:	you feed teddy.	***(Topic: Feeding teddy.)***
2	Linda:	0 [^ pretends to scoop food from the bowl].	
3	Linda:	bowl.	***(Topic: Naming the items.)***
4	Mother:	bowl.	
5	Linda:	pei [: spoon] [^ shows mother the spoon].	
6	Mother:	spoon.	

Of the strategies described above, the use of vocalisations became less noticeable across time but the use of imitation, simple responses to agree, disagree and to respond to her mother's yes/no questions, and labelling with one word utterances were still observed.

By T2, another conversational behaviour appeared to emerge: she was able to consistently provide information to her mother's follow-in directives and directives instead of relying on basic strategies such as vocalisations and yes/no answers. For instance, Example 5.6 shows how she answered her mother's cloze procedure with a word. This indicated a shift from producing non-substantive to substantive topic turns, a change that is associated with the improvement in her expressive language skills. While non-substantive turns include imitations, fillers and responses to yes/no questions that indicate continuing attention with limited linguistic competency, substantive turns include those that provide information about the event through spontaneous comments or responses to wh-questions that require higher linguistic competence (Lucariello, 1990).

Example 5.6 (Linda; T2: 2;7.23)

1	Mother:	mama do +..?	***(Topic: Mother's turn to draw***
2	Linda:	spider.	***a spider.)***

By T2, she also began to respond to her mother's prompts and provided responses that contained more specific information. By using similar questions throughout a part of an activity, her mother constructed a framework of topic turns that she could produce to sustain that activity. It has been argued that repetitive modelling of specific utterance structures, also known as ***priming*** (L. B. Leonard, 2011) and follow-in directives prompt children to produce similar topic turn structures that assist the activity to progress (Yoder & Davies, 1990; Yoder, Davies, et al., 1994). Through these prompts, she was able to make comments that were relevant to the activity she and her mother were engaged in with topic maintaining responses containing both minimal and additional information. For instance in Example 5.7, while engaging in a drawing activity, she responded to her mother's cloze procedure with a full sentence. Following her mother's affirmation and expansion of her utterance, she tried to repair her mother's utterance (line 6; "Gollie" was repaired with "doggie").

Example 5.7 (Linda; T2: 2;10.7)

1	Linda:	[^ pushes the board to MOT] mama [: mummy] do.	***(Topic: Child wants mother to draw.)***
2	Mother:	mummy do [^ clears the board].	
3	Mother:	mummy do +..?	
4	Linda:	mummy draw Go [: Gollie] Neighneigh.	
5	Mother:	Gollie and Neighneigh.	
6	Linda:	oh Goggie [: Doggie] eh oh Goggie [: Doggie] and Nei [: Neighneigh] oh Goggie [: Doggie].	

To summarise, Linda presented with a change from producing topic turns with limited non-substantive information to topic turns with more substantive information when collaborating on activities. The analysis indicates two potential factors that might have motivated the emergence of substantive information: (i) the promptings provided by her mother, and (ii) the advancement in her language competence.

(ii) Expanding a joint activity

In the conversational data, it was noticed that Linda used a variety of ways to expand the shared activities that she and her mother were engaging in. At T1, it was noted that an expansion of an activity was typically guided by the nature of the activity, thus occurring as a secondary effect of the activity itself. These activities provided contextual cues that helped the children to contingently shade the central focus of an activity to another central focus. Activities such as "playing with the blocks", or "shape sorters" were repetitive and not bound by required sequential orders, therefore allowing more flexibility for a contingent expansion. For instance, as shown in Example 5.8, after taking the lid of a bucket full of blocks off, Linda expanded the focus of their activity by stacking the blocks. As there are many ways of expanding their play after the initial act of "opening the bucket" including "stacking the blocks up", other acts such as "sorting the blocks" or "posting the blocks" would also be seen as relevant ways of expanding the activity.

Example 5.8 (Linda; T1: 2;5.1)

1	Mother:	lid off?	***(Topic: Taking the lid of the***
2	Linda:	ok.	***bucket off.)***
3	Mother:	0 [^ helps child to pull the lid off].	
4	Linda:	[^ turns the bucket upside down] mm.	
5	Mother:	yeah.	
6	Linda:	[^ stacks blocks] block.	***(Topic: stacking the blocks on***
7	Mother:	yes.	***the bucket).***

Another group of activities that have similar effects and facilitate activity expansion is "book reading". Book reading consists of predetermined story plots that are contingent to each other that Linda and her mother could adhere to. For instance, in Example 5.9, Linda and her mother were labelling the pictures in each page of a book. By using the book as the main tool for their activity, expansion of the activity was guided by the pictures in the book. Therefore, Linda was able to expand the book reading activity by labelling one picture after another.

Example 5.9 (Linda; T1: 2;5.12)

1	Linda:	gaga@p [: duck].	***(Topic: Duck.)***
2	Mother:	duck, yeah.	
3	Mother:	gaga@p [: duck].	
4	Linda:	ka@p [: cow] [^ points to the picture of a cow].	***(Topic: Cow.)***

Other than this, expansion of a joint activity also occurred when Linda made a categorical association between the focus of the preceding topic and an item in the environment, as shown in Example 5.10. In this example, she associated the "coat" picture that she and her mother were looking at with her mother's coat (line 7).

Example 5.10 (Linda; T1: 2;5.19)

1	Mother:	oh how about we have a look at one [^ picks up a card from the floor].	***(Topic: Picture card, coat.)***
2	Mother:	what's this one?	
3	Linda:	no.	
4	Mother:	coat.	
5	Linda:	no.	
6	Mother:	coat [^ puts the card on the floor].	
7	Linda:	uh [^ points to her mother's coat].	***(Topic: Mother's jacket.)***
8	Mother:	coat.	

It is also suggested that one of the possible factors that might have facilitated Linda's topic extension was the topic turn structures used in her mother's conversational scaffolding. Linda's mother would expand activities with slight modifications of her behaviours, such as tapping different objects with a stick. At T1, Linda would tend to imitate her mother's non-verbal behaviours more frequently than with words. For instance, in Example 5.11 they were first engaged in a drum tapping activity. Her mother then prompted her to tap other items i.e., book (line 7), and xylophone (line 13). Later in the exchange, Linda spontaneously tapped the different instruments (line 19 and 20) and adjusted the intensity of her tapping (line 22) after her mother's comment.

Example 5.11 (Linda; T1: 2;5.12)

1	Mother:	this one [^ points to the top part of the drum]?	***(Topic: Tapping, top part of the drum.)***
2	Linda:	0 [^ hits the top part of the drum].	
3	Mother:	yeah.	
4	Mother:	bang [x 2].	
5	Linda:	0 [^ hits the drum again].	
6	Mother:	yeah [^ puts the drum down].	
7	Linda:	ka [^ points at the book].	***(Topic: Tapping, book.)***
8	Mother:	on here, on the book [^ holds the book for child]?	
9	Linda:	0 [^ hits the book with the stick and smiles at mother].	
10	Mother:	oh good noise!	
11	Linda:	0 [^ hits the book again].	
12	Mother:	yeah.	
13	Mother:	what about this one [^ puts a xylophone in front of Linda]?	***(Topic: Tapping, xylophone.)***
14	Mother:	do it on her?	
15	Linda:	0 [^ hits the xylophone then looks at her mother].	
	Mother:	oh nice noise.	
16	Linda:	uh [^ hits the xylophone again, then smiles].	
17	Mother:	good girl!	
	Later in the conversation (after 1:24 minutes)		
18	Linda:	0 [^ taps the xylophone].	***(Topic:Tapping, xylophone.)***
19	Linda:	0 [^ hits the drum then the can and turns her gaze to her mother].	***(Topic:Tapping, xylophone.)***
20	Mother:	it's loud isn't it?	***(Topic:Loud noise.)***
21	Linda:	0 [^ hits her couch softly and turns her gaze to her mother].	***(Topic:Soft noise.)***

By T2, Linda still appeared to rely on the non-sequential nature of some of the activities for topic expansion. At the same time, she was able to make more types of associations between the preceding conversational topic and the items available in her environment. For instance, in Example 5.10, after shading the focus of their peek-a-boo game to the “dog” (line 1), she made a causative association by shading the focus of the activity to

the preceding focus (the doll) and commented that it is not the doll's turn this time (line 4). This was different from the types of associations that she exhibited at T1 as those were related to grouping similar items. However, by T2, she was able to initiate a displacement topic by relating her immediate environment with a past event, indicating maturity in her language and cognitive competence.

Example 5.12 (Linda; T2: 2;7.23)

Child and mother are playing peek-a-boo with the doll.

1	Linda:	ok xxx [^ points at the dog].	***(Topic: Playing peek-a-boo with doggie.)***
2	Mother:	with woofwoof [^ takes the dog]?	
3	Mother:	here we go.	
4	Linda:	ah no more xxx [^ looks at the doll].	***(Topic: Not playing peek-a-boo with Grace.)***
5	Mother:	no more Grace.	
6	Linda:	[^ puts the doll away] uh.	
	Mother:	mm!	

By T2, Linda also expanded an activity with a new behaviour. She would request that the activity is repeated through swapping roles with her mother. This behaviour was not present at T1 and could be learnt from her mothers' frequent prompts to take turns to play a certain role. In Example 5.13, she expanded the activity by initiating a role swap with her mother (line 4).

Example 5.13 (Linda; T2: 2;10.7)

1	Mother:	this is a [^ points at the drawing] ...?	***(Topic: Child draws a mouse.)***
2	Linda:	Ga [: Linda] do mouse.	
3	Mother:	mouse.	
4	Linda:	mama mouse [^ moves away from the board].	***(Topic: Mother draws a mouse).***
5	Linda:	ma [//] mama mou(se).	
6	Mother:	mama draw mouse?	
7	Linda:	mouse.	
8	Mother:	mama draw mouse.	
9	Linda:	ok.	

The newly observed strategies that Linda used to expand an activity (i.e., making causative associations and swapping roles) suggest that for Linda, taking different roles and perspective on demand was a more complex skill than making categorical associations. While

Duchan (1991) argued that early construction of event representations involved categorisation of objects, participants, and actions, initiation of a role swap may require an understanding of the differences between the roles and the ability to execute these roles independently.

By T2, it was noticed that Linda initiated an expansion of an activity using similar event schemas that her mother scaffolded earlier in the same conversation or in other conversations. She was merely reconstructing the event just as it was stored in her cognitive representation, until her mother helped her to notice the variations between the content of her topic turns and the current activity. In Example 5.14, her mother scaffolded the scripts for drawing persons by labelling each of the person's body part while drawing (line 6 to 13) in an earlier part of the conversation. In the next topic, when they shifted the drawing from "mummy" to "Jack", Linda was able to label the body parts on her own (line 16 to 19). However, when the topic was shifted to another drawing, "house", Linda tried to construct her topic turns according to her previous experience (line 27, 28 and 30) without realising that a house does not consist of "body parts". Her mother then scaffolded a new set of topic turn structures for her.

Example 5.14 (Linda; T2: 2;9.11)

1	Mother:	you draw mummy [^ cleans the board].	***(Topic: Draws mummy.)***
2	Linda:	yay!	
3	Mother:	oop [= indicates that the board is clean].	
4	Linda:	eh.	
5	Linda:	eh [^ turns her gaze to mother].	
6	Mother:	head [^ draws].	
7	Linda:	head.	
8	Mother:	eyes [= drawing].	
9	Linda:	eyes [^ copy's mum's hand movement].	
10	Mother:	body [= drawing].	
11	Mother:	hair [= drawing].	
12	Linda:	ki [: hair].	
13	Mother:	no ..?	
14	Linda:	no [: nose].	
	Later in the conversation, after 1;18 minutes.		
15	Mother:	mummy draw Jack [^ draws].	***(Topic: Draws Jack.)***
16	Linda:	ki [: head] [= mother is drawing].	
17	Linda:	eyes [= labels mother's drawing].	
18	Linda:	no [: nose] [= labels mother's drawing].	
19	Linda:	gi [: leg] [= labels mother's drawing].	
20	Mother:	mou ..?	
21	Linda:	mah [: mouth].	
	Later in the conversation, after 2;18 minutes.		
22	Mother:	mummy do a house.	***(Topic: Draws house.)***
23	Mother:	house.	
24	Linda:	ok.	
25	Linda:	ok [= mother begins to draw] .	
26	Linda:	ki [: head].	
27	Linda:	body [= mother is drawing a rectangle].	
28	Mother:	roo ..?	
29	Linda:	ki [: head].	
30	Mother:	roof [= drawing].	

To summarise, the changes shown by Linda when expanding an activity seemed to take place in parallel with the development of her language skills and with her understanding of the activity and the world in which it is embedded. From showing reliance on contextual and linguistic cues that are present to just the here-and-now, she was able to incorporate past events modelled by her mother, to expand an activity.

(iii) Returning to a previous activity

In Linda's conversational data, when returning to a previous activity, at T1, she did not seem to do this with any strategy. Her behaviour was merely an effect of her inattention or lack of comprehension on a topic that was newly introduced by her mother. For instance, in Example 5.15, she returned to the previous activity (line 4) after a topic change by her mother (line 3). It was argued that topic changing on request demands higher cognitive processing than maintaining the focus of attention (McCarthren, et al., 1995; Rocissano & Yatchmink, 1983). This may cause Linda to have difficulty switching her focus of attention to the newly introduced topic and so she continued with the production of a topic turn that was related to the previous topic.

Example 5.15 (Linda; T1: 2;5.12)

1	Linda:	ohdei [: all day].	***(Topic: The wheels on the bus song.)***
2	Mother:	all day?	
3	Mother:	do you want to do it up here [^ puts a block on the couch]?	***(Topic: Playing blocks on the couch.)***
4	Linda:	ohdei [: all day].	***(Topic: The wheels on the bus song.)***

At T1, Linda would also return to a previous activity when her mother did not respond as she had expected. For instance, in Example 5.16, she repeated her first utterance (line 3) when her mother missed that utterance and said a word that was unrelated to Linda's utterance. It is an indication that Linda was redirecting her mother's attention to a previous topic when her mother did not attend to that topic.

Example 5.16 (Linda; T1: 2;5.12)

1	Linda:	Ga [: Linda] [^ points at herself].	***(Topic: Linda.)***
2	Mother:	duck.	***(Topic: Reading, duck.)***
3	Linda:	Ga [: Linda] [^ points at herself].	***(Topic: Linda.)***
4	Mother:	Linda?	

At T2, the factors described above (i.e., child's inattention and lack of comprehension of a topic turn, and mother's inattention) would still result in a switch to a previous topic for Linda. As demonstrated in Example 5.17, Linda missed her mother's change of activity focus (line 4) and therefore continued to talk about "monkey" (line 5).

Example 5.17 (Linda; T2: 2;9.11)

1	Linda:	mungi [: monkey].	**(Topic: Draws monkey.)**
2	Linda:	mungi [: monkey].	
3	Linda:	mungi [: monkey].	
4	Mother:	frog.	**(Topic: Draws frog.)**
5	Linda:	ok monkey.	**(Topic: Draws monkey.)**

Similarly, Example 5.18 shows another example of how Linda kept returning to a particular topic, in their activity of "identifying parts of their hand". Linda and her mother were first talking about "thumb" (line 1 to 5). When her mother switched the focus of their activity to fingers (line 6), she imitated "fingers" (line 7) but appeared to have difficulty providing a substantial response (line 10) following her mother's next utterance "mummy's finger" (line 8), a more complicated two-word utterance. While Linda's reintroduction of the topic "thumb" (line 12) may reflect several possibilities including lack of interest in talking about "fingers", difficulty in comprehending or answering the question asked by her mother, it may also reflect that she repeated the sounds of the word "fingers" without performing sufficient lexical processing of "fingers". This latter argument is associated with a fundamental verbal working memory deficit in individuals with Down syndrome (Jarrold, Purser, & Brock, 2006). It was reported that verbal working memory is required to successfully maintain and represent the phonological form of new sounds when they are first encountered, and to support subsequent learning. With the increase in sentence complexity, Linda might have difficulty processing this information. When her mother extended their conversational topic even further to "how many fingers?" she returned to talking about "thumb" (line 13). This suggests that perhaps more collaboration on the topic of "mother's

fingers" may help Linda to process the information better before the central focus of their activity is shaded.

Example 5.18 (Linda;T2: 2;10.7)

1	Linda	um [: thumb].	***(Topic: Mother's thumb.)***
2	Mother	this is my [^ shows child her thumb] ..?	
3	Linda	um [: thumb].	
4	Mother	thumb [^ draws thumb].	
	Linda	um [: thumb].	
5	Mother	fingers.	***(Topic: Mother's fingers.)***
6	Linda	fingers.	
7	Mother	yeah.	
8	Mother	mummy's finger.	
9	Linda	uh.	
10	Mother	fingers [^ shows child her fingers].	
11	Mother:	how many fingers?	***(Topic: Counting mother's fingers.)***
12	Linda:	um [: thumb].	***(Topic: Mother's thumb.)***

While scaffolding seemed to facilitate collaboration and expansion of a joint activity, activity switching seemed to be an effect of abrupt topic changes by the mother, which eventually results in another topic change by the child. In Example 5.19, it took Linda a while to switch her focus of attention to her mother's newly introduced topic. In this example, Linda initiated an activity that was related to "drawing a pig" but her mother switched it to "sock" because of Linda's non-communication action in taking her sock off (line 3). Following this, Linda's focus of attention was still on "pig" (line 8) despite being prompted twice by her mother (line 5 and 6). She was only able to switch her focus of attention to sock after her mother changed the topic to sock again and prompted her with another wh-question (line 8 and 10). Similar to Example 5.18, Linda's persistence with the topic "drawing a pig" can be attributed to several possible reasons including not being liked to be quizzed about what a sock is; and not interested in talking about the sock; a probably underlying working memory deficit (Jarrold, et al., 2006) in processing the sudden change in their conversational topic; or she did not foresee that her mother would change their conversational topic based on a behaviour (i.e., pulling her sock off) that was done without any communication intention. For the last two reasons suggested, the new and non-contingent information in the "sock" topic might be abruptly introduced for Linda and therefore she had difficulty retaining and processing this information, until her mother talked about "the sock" over a few times.

Example 5.19 (Linda; T2: 2;9.11)

1	Linda:	[^ turns her gaze to mother] pig uhm daw [: draw] wawa [: pig].	***(Topic: Draws pig.)***
	Mother:	yep, piggie.	
2	Linda:	ugh [^ pulls her sock	
3		off].*non-communicative*	
4	Mother:	what are these [^ points at the sock]?	***(Topic: Sock.)***
5	Linda:	uh [^ looks at mother]	
6	Mother:	what's that [^points at the sock] ?	
7	Linda:	piggy.	***(Topic: Draws pig.)***
8	Mother:	what's come off?	***(Topic: Sock.)***
9	Linda:	huh [^ turns her gaze at mother].	
10	Mother:	what is that?	
11	Linda:	ko [: sock] [= holding her sock].	
12	Mother:	sock.	

To summarise, the changes that Linda exhibited in the topic turns that she used to return to a previously engaged activity reflect a difficulty in switching to a new focus of attention introduced by her mother. While identification of the reasons for this difficulty is beyond the scope of this study, they may reflect a range of possibilities including her motivation to engage in that topic and verbal memory deficit.

(iv) Proposing a new activity

Just like returning to a previous activity, at T1, Linda did not appear to use any specific strategy when proposing a new activity. Rather, her behaviour was a result of inattention or lack of comprehension, as in Example 5.20. Linda's topic change (line 2) might be caused by her inattention to her mother's question or compromised comprehension of the question. This resulted in an abrupt termination of the preceding topic.

Example 5.20 (Linda; T1: 2;5.12)

1	Mother:	who's this [^ points at the picture]?	***(Topic: Reading, cow.)***
2	Linda:	uhm eat [=! looking at the picture on the opposite page].	***(Topic: Reading, eating.)***
3	Mother:	eating yeah!	

At T1, Linda would also switch to a new activity when she noticed another item or event in the environment. Example 5.21 demonstrated how Linda switched the focus of the activity by commenting on a novel item (line 2) that she found and did not respond to her mother's earlier request.

Example 5.21 (Linda; T1: 2;5.12)

1	Mother:	pour the tea [^ pretends to pour tea out from a teapot]?	***(Topic: Tea pouring.)***
2	Linda:	[^ takes a pink item out from the basket] eh.	***(Topic: Pink toy.)***

At T1, a switch to a new activity would also be initiated when she wanted to end the preceding activity. In Example 5.22, she left the "block game" without informing or providing any hint to her mother. As she moved towards the bookshelf, her utterance and her movement (line 5) helped her mother to interpret her intention, which was to start a new activity.

Example 5.22 (Linda; T1: 2;5.12)

1	Linda:	[^ takes a block out from the box and puts in on the couch].	***(Topic: Puts blocks on couch.)***
2	Mother:	on top [^ helps child to stack that block on another block].	
3	Linda:	0 [^ moves away]. Non-communicative	
4	Mother:	do more?	
5	Linda:	uh ta [^ moves to the bookshelf].	***(Topic: Book.)***
6	Mother:	you want a book?	

Finally at T1, Linda proposed a new activity when she suddenly recalled an unrelated event from her past experiences. In Example 5.23, she switched the activity abruptly from "tapping the table" to "talking about her friend, Tasha". This new activity was not related to the block game at all and was perhaps understood by her mother because of her familiarity with her child's experiences. Linda's change in topic was picked up by her mother's in her second utterance.

Example 5.23 (Linda; T1: 2;5.12)

1	Mother:	you want mummy to do it?	***(Topic:***	***Tapping the table.)***
2	Linda:	ok.		
3	Linda:	Yaya [: Tasha]	***(Topic:***	***Tasha.)***
4	Mother:	0 [^ gestures tapping].	***(Topic:***	***Tapping the table.)***
5	Mother:	Tasha?	***(Topic:***	***Friends of Linda.)***

At T2, a switch to a new activity would still occur because of the behaviours described above. However, by T2, a new strategy was observed. Linda ended the preceding activity appropriately before expressing her intention to change the activity. For instance, in Example 5.24, she informed her mother her intention to stop the preceding activity i.e., undressing the doll (line 3 and 4) and then switched the focus of the activity to the "clasp on the doll's dress" (line 5).

Example 5.24 (Linda; T2: 2:9.11)

1	Linda:	uhuh [= holding the doll].	***(Topic:***	***Takes baby's dress***
2	Mother:	gonna [: going to] take dress off?	***off.)***	
3	Linda:	no.		
4	Linda:	dress.		
5	Linda:	[^ throws the doll to mother] mummy do.	***(Topic:***	***Clasp on doll's dress.)***
6	Mother:	mummy do what?		
7	Linda:	boo [^ puts her hands together].		
8	Linda:	boo.		
9	Mother:	put it together [^ turns the doll backwards and puts the back part of the dress together].		
10	Linda:	yeah.		

To summarise, the changes in Linda's topic turns that propose a new activity seem to reflect a consequence of a change in the conversational topic by the mother or distraction by an unrelated event. Initially, these resulted in an abrupt introduction of a new activity but across time, Linda was able to introduce a new topic by ending the mothers' preceding topic first.

5.3.2 Summary of Linda's conversational strategies

The conversational excerpts extracted from the conversations between Linda and mother suggested that Linda's responsive conversational behaviours at T1 were characterised by her motivation to be responsive to her mother, and intention to advance the activities she was engaged in. However, because of language limitations, she was using mainly topic turns that consisted of minimal linguistic information to interact with her mother. Table 5.2 summarises the strategies employed by her, before her mother attended the ITTT programme (T1), and after her mother attended the programme (T2). The changes in Linda's conversational behaviour indicates an increase in pragmatic awareness especially in achieving contingency between topic turns when she was collaborating on an activity, or expanding or switching the focus of an activity. This increase in contingency was facilitated by her mother's conversational scaffolding and improvement in her language skills.

At T1, Linda collaborated on an activity by maintaining the topic with vocalisations, imitation, agreement or disagreement with her mother, responding to her mother's yes/no questions, and labelling items in the conversational context. By T2, her responses with vocalisations reduced drastically but she continued to imitate, to agree and disagree, to answer yes/no questions and to label while collaborating on an activity. In addition to these, new strategies emerged, as her language skills improved. She responded to her mother's directives and follow-in directives with words and initiated comments with either single words or multi-word utterances. It was noticed that the structure of her topic turns were those that her mother had scaffolded earlier in their conversation, or in other conversations.

In her interaction with her mother, activities were expanded by both of them at T1 and at T2. At T1, Linda did not employ any specific strategy to expand an activity. Activity expansion appeared to be a secondary effect of the nature of the activities she was engaged in e.g., those that are structurally repetitive and do not obligate a sequential flow. She would

also expand the focus of an activity by making associations between the preceding activity and a relevant event or item in the environment, or by repeating actions after her mother's demonstrations. By T2, while these behaviours continued, expansion of an activity became more intentional. She would request to switch roles with her mother, which reflect an improvement in perspective understanding, and insert event schemas that she learnt from their earlier conversation. The insertions were made without much modifications, therefore did not fit the activity contingently, all the time. These intentional behaviours appeared to be facilitated by her mother's scaffolding too, as they have been demonstrated to her throughout their play interactions.

In switching the focus of an activity, whether to a previously engaged or a new activity, Linda's conversational behaviours at T1 seemed to be affected by lack of attention to her mother's change in topic, lack of interest in that newly introduced topic, or lack of comprehension of her mother's topic turn. At T1, when her mother missed her topic turn, she would redirect her mother to the preceding activity. When she proposed a new activity, it was mostly caused by her intention to end the preceding activity, a sudden recall of an unrelated topic, or a distraction by a newly discovered event or item in the environment. By T2, while Linda persisted with these behaviours, a strategy that reflects higher relevance when proposing a new activity emerged. She could sometimes end the preceding activity appropriately, instead of abandoning it, by contributing a brief response to her mother before initiating a new activity.

The findings from Linda's conversational behaviours suggest that Linda's conversational behaviours are related to her mother's conversational scaffolding. To sustain children's focus of attention in an activity, "framing" and "follow-in directives" help children to construct topic turns that facilitate their engagement in an activity. Constant modelling of how an activity can be expanded may help them to create associations between events in the activity, and then reproduce them when the activity is repeated. Contrariwise, constant switching of activities could result in more non-contingent topic turns from the child. Topic turn production also affects the advancement of an activity. TMs sustain the focus of the activity, TEs help the activity to flow from one phase to another in a contingent manner, and TCs result in more activity switching.

Table 5.2 Conversational changes observed in Linda

Activity type	Conversational behaviour	
	T1	T2
Collaborating on an activity	• Topic maintaining responses with vocalisations.	–
	• Imitation.	+
	• Agreement/disagreement and answering yes/no questions with topic maintaining responses with minimal information.	+
	• Labelled with topic maintaining responses with minimal information.	+
		• Responded to follow-in directives and directives with words.
		• Commented with topic maintaining responses with minimal or additional information.
Expanding an activity	• Production of topic turns was guided by the nature of the activity or game.	+
	• Made categorical associations between two elements.	+
	• Repeated actions after mother's demonstrations.	+
		• Requested to switch roles.
		• Repeated topic turns from earlier topics with very minimal modifications.
Returning to a previous activity	• Inattention, lacked comprehension of, or uninterested in mother's newly introduced topic.	+
	• Previous topic unattended by mother.	+
Proposing a new activity	• Inattention, lacked comprehension of, or uninterested in mother's newly introduced topic.	+
	• Commented on a novel object or event in the environment.	–
	• Ended or changed an activity abruptly.	+
	• Recalled a topic unrelated to the activity.	+
		• Ended mother's topic appropriately then directed mother's attention to a new topic.
		• Recalled a topic that was related to the activity but tangential to the preceding topic turn.

Note. – indicates that the behaviour was no longer observed by T2; + indicates that the behaviour was still observed at T2.

5.3.3 Lucas

Lucas was diagnosed with symptoms of ASD at around the age of 2;6. He had an extensive knowledge of his favourite toy characters such as those from Thomas the Tank Engine and Bob the Builder, and could name types of dinosaurs, airplanes, vehicles, etc. fluently. Lucas lived with his older brother and both parents. He enjoyed interacting with the adults around him but appeared apprehensive when he had to interact with his peers. Lucas had been identified as having difficulties with joint referencing and sensory-motor skills. Therefore, his intervention programme was tailored for these issues.

(i) Collaborating on a joint activity

Just like Linda, Lucas demonstrated good awareness of his role as a participant in the conversations with his mother, and could take turns with his mother to advance an activity. At T1, it was noticed that he collaborated on activities using strategies that were similar to Linda's strategies, except vocalisations. Strategies that were similar to Linda's included imitation, simple agreement or disagreement with his mothers, and labelling. In Example 5.25, he imitated his mother's utterance (line 6) and this helped him to maintain the conversation and sustain the activity.

Example 5.25 (Lucas; T1: 3;7.13)

1	Mother:	Ralph is [= still feeding Ralph] ...	***(Topic: Ralph's drinking.)***
2	Mother:	is he still drinking?	
3	Mother:	gosh he's a thirsty doggie, isn't he?	
4	Lucas:	0 [^ feeds Ralph and laughs].	
5	Mother:	he's thirsty.	
6	Lucas:	he's thirsty.	

At the same time, Lucas was also able to respond to his mother's follow-in directives and directives by responding with both solicited and additional unsolicited information. For instance, in Example 5.26, he responded to his mother's question without providing any additional unsolicited information (line 2) but in Example 5.27, he provided additional information (i.e., "on the blue plate") to maintain the conversational topic (line 2).

Example 5.26 (Lucas; T1: 3;7.13)

1	Mother:	oh do you not want the saucers?	***(Topic: Saucers.)***
2	Lucas:	yes I do want the saucers.	

Example 5.27 (Lucas; T1: 3;7.13)

1	Mother:	what's Pooh_Bear going to have?	***(Topic: Pooh is hungry.)***
2	Lucas:	orange on the blue plate [^ puts the orange on Pooh's blue bowl].	

Apart from these, he also collaborated on an activity by making comments that were related to the activity. For instance in Example 5.28, while putting his teddy Ralph on a toy bus, he made a comment on "where Ralph was seated" (line 3). This comment was contingent to the activity and his mother's preceding utterances.

Example 5.28 (Lucas; T1: 3;7.13)

1	Mother:	he'll have to sit on the front, won't he?	***(Topic: Putting Ralph on the bus.)***
2	Mother:	for a drive.	
3	Lucas:	he's on the front now.	

The conversational excerpt shown here suggests that Lucas's topic turn contributions might have been facilitated by his mother's frequent use of topic turns with similar structures (i.e., priming; L. B. Leonard, 2011), including wh-questions. Lucas imitated these topic turn structures and produced them spontaneously in his subsequent topic turns. In Example 5.29, Lucas and his mother were giving out toy fruit to their teddie bears in a pretend tea party. In this excerpt, his mother used questions to prompt Lucas to distribute the fruit (line 4 and 8) and he responded only after his mother's questions. However, after those two topic turns (line 5 and 9), he spontaneously contributed a similar utterance to give another fruit away (line 11). This spontaneous contribution suggests that his mothers' use of wh-questions facilitated the selective retrieval of information that is appropriate and relevant to this activity, and limited his scope of attention into a manageable domain (Lucariello, 1990; Ornstein, et al., 2004; Ratner, 1984), in which case, giving a fruit away.

Example 5.29 (Lucas; T1: 3;7.13)

1	Mother:	anyone else want any more fruit?	***(Topic: Pear.)***
2	Mother:	we do have a pear [^ shows child a pear].	
3	Mother:	no one has a pear yet.	
4	Mother:	you want a pear?	
5	Lucas:	yes for Ralph.	
6	Mother:	for Ralph [^ gives the pear to child].	
7	Mother:	ok Ralph here we go.	
8	Mother:	who else?	
9	Lucas:	pear for Orange_Ruffy [^ puts the pear on Orange Ruffy's plate].	
10	Mother:	oh one for Orange_Ruffy ok.	
11	Lucas:	and one for Pooh_bear [^ puts the pear in Pooh's bowl]!	
12	Mother:	oh me yes I'll have another pear cause I am always hungry [=! Pooh's voice].	

By T2, it was observed that even though Lucas still produced topic maintaining responses with minimal information or with only information solicited by his mother, as shown in Example 5.30, he also collaborated on conversational topics using topic maintaining responses with unsolicited additional information, as shown in Example 5.31. This indicates a shift from producing topic turns with less linguistic information to topic turns with more information.

In Example 5.30, he collaborated by disagreeing with his mother's preceding utterance (line 2), just like he would do at T1.

Example 5.30 (Lucas; T2: 4;2.9)

1	Mother:	oh that was a bit scary.	***(Topic: Feeling scared.)***
2	Lucas:	it wasn't.	

In Example 5.31, while playing Buckaroo (i.e., taking turns to hang toys on a toy camel), he responded to his mother's question and provided additional information (i.e., "I want to have the pot on") without any solicitation from his mother (line 2).

Example 5.31 (Lucas; T2: 3;11.4)

1	Mother:	and who's turn is it?	***(Topic: Buckaroo.)***
2	Lucas:	my turn I want to have the pot on.	

At T2, it was noticed that Lucas produced utterances with similar structures to collaborate on an activity. Based on his mother scaffolding techniques shown here, it is suggested that her repetitive use of similar topic turn structures (e.g., Example 5.29) might have facilitated the change. For instance, in Example 5.32, while pretending to "make burgers for dinner" he initiated the activity by asking "you like some dinner?" and collaborated on this activity by asking similar questions (i.e., "you like dinner" in line 4 and "who like dinner?" in line 6). This was similar to Example 5.33. In this example, his mother would ask similar questions while pretending to have a tea party (line 3).

Example 5.32 (Lucas; T2: 3;11.4)

1	Lucas:	you like some dinner [^ takes the food on the tray]?	***(Topic: Burger for dinner.)***
2	Mother:	oh yes, please [=! talks in the teddie's voice].	
3	Mother:	Lucas, I like burgers.	
4	Lucas:	you like dinner.	
5	Mother:	that's a big burger, Lucas!	
6	Lucas:	who like dinner?	
7	Mother:	yep, we can have dinner.	
8	Mother:	that is a big burger.	

Example 5.33 (Lucas; T2: 3;11.4)

1	Lucas:	tea?	***(Topic: Coffee and tea.)***
2	Mother:	tea and coffee out.	
3	Mother:	who wants coffee and who wants tea?	

To summarise, it is suggested that one noticeable factor that might have motivated Lucas to collaborate on the activities using more complex structures was *priming* of the topic turn structures that his mother used as a part of her scaffolding strategy. By T2, Lucas was able to produce topic turns of more complex language structures and that are relevant to the

conversational topic rather than relying on stereotypical utterances learnt from his environment.

(ii) Expanding a joint activity

When expanding an activity, at T1, two conditions were observed. First, just as with Linda's case, for Lucas, expansion of an activity occurred as a secondary effect of the nature of those activities that did not require specific sequential organisation. These activities provided contextual cues for him to shift the focus of the activity from one to another, contingently. For instance in Example 5.34, while playing tea party with a few teddies, Lucas extended the topic from "fruit for Cissy" to "another apple" (line 5) because he found the second apple in the bag of toys.

Example 5.34 (Lucas; T1: 3;7.13)

1	Mother:	oh Lucas, Lucas I want some fruit [=! Cissy's voice].	***(Topic: Fruit for Cissy.)***
2	Mother:	can I have an apple please?	
3	Lucas:	0 [^ gives an apple to Cissy].	
4	Mother:	oh thank you Lucas [=! Cissy's voice].	
5	Lucas:	another apple [^ takes another apple].	***(Topic: Apple.)***
6	Mother:	oh who's going to have that apple?	

Second, other than expanding an activity as a secondary effect of nature of the activity, Lucas would also insert event schemas or reinitiated topics that he had previously learnt into the activities he was engaging in. This involved retrieval of subsequent actions from the child's internal representations of similar past experiences (Fivush & Slackman, 1986). These topic turns were sometimes contingent and sometimes non-contingent with the preceding topic. This suggests that he was not fully competent at extending topics contingently but able to relate to activities that were perceived as similar. In Example 5.35, in a "tea party play" he attempted to extend the focus of the activity from "giving the teddies a bowl each" to "getting the burgers out". Although both were related to "tea party", the change of topic from "bowls" to "burgers" (line 5) seemed abrupt and non-contingent.

Example 5.35 (Lucas; T1: 3;7.13)

1	Mother:	and shall we have a bowl each?	***(Topic: Bowls.)***
2	Mother:	and then the teddies can have some fruit?	
3	Lucas:	bowls.	
4	Mother:	green bowl.	
5	Lucas:	gonna get the burgers out.	***(Topic: Burgers.)***
6	Mother:	oh we get the burgers out?	

In another example (Example 5.36), while playing with toy vehicles, he was able to extend the topic contingently from "pushing the bus" to "going to the city" (line 4).

Example 5.36 (Lucas; T1: 3;7.13)

1	Mother:	can you take the bus down there.	***(Topic: Pushing the bus.)***
2	Lucas:	yeah.	
3	Mother:	ok broom [x 5]!	
4	Lucas:	going to city!	***(Topic: Going to the city.)***
5	Mother:	off to the city vroom [x 2]!	

At T2, Lucas was still depending on the nature of the activity and relating events with similar elements to expand the activities he was engaged in. However, a change was noticed in the way he expanded the activities. By T2, he was able to replace some of the elements from his past experiences with new elements that are relevant and specific to the current activity. This flexibility in modifying his topic turn contribution was noticed as a possible result of repeated scaffolding from his mother (e.g., modelling and conversational repair). For instance, in Example 5.37, while playing with the paper planes, his mother expanded the activity by describing how Lucas's sibling decorated the planes with a "star" (line 2). At a later stage in the conversation Lucas was able to make a similar expansion using the same strategy but with a different utterance structure i.e., he tried to describe that his sibling coloured it green but used the wrong verb ("drew" instead of "colour" in line 4) and his mother helped him to repair that. Later, he attempted another similar expansion (line 12) and was successful.

Example 5.37 (Lucas; T2: 3;10.0)

1	Mother:	that's a big Jetstar.	***(Topic: Daniel's drawing.)***
2	Mother:	he stuck a star on the tail Lucas.	
3	Mother:	look at the star.	
	Later in the conversation, after 14 seconds		
4	Lucas:	Daniel drew it green!	***(Topic: Daniel's drawing.)***
5	Mother:	he coloured it green didn't he?	
6	Lucas:	he coloured that.	
	Later in the conversation, after 46 seconds		
7	Lucas:	the planes [^ points at the planes].	***(Topic: Naming the planes.)***
8	Lucas:	xxx [=! mumbles].	
9	Lucas:	twenty.	
10	Lucas:	xxx [=! mumbles].	
11	Mother:	[^ laughs].	
12	Lucas:	that one in the green.	***(Topic: Daniel's drawing.)***
13	Lucas:	Daniel colour it green.	
14	Mother:	yeah.	

To summarise, the findings suggest that Lucas made a shift from relying on the non-sequential nature of the activities to incorporating similar elements from past events when expanding an activity. This change may have been facilitated by constant modelling and prompting from his mother, and their frequent engagement in familiar activities.

(iii) Returning to a previous activity

At T1, just like Linda, Lucas did not seem to use any specific strategy to switch to a previous activity in the conversation. For instance, a reinitiation of an activity occurred as a secondary effect of his inattention to the mother's newly introduced activity or the mother's inattention to the child's newly introduced activity. This finding supports the notion that mother's TC does not facilitate children's engagement in a particular activity because of the increase in cognitive load to switch to new focus on attention, on demand (McCarthren, et al., 1995; K. Nelson, 1986; Tomasello & Farrar, 1986). While conversational repair had been reported as a means that children use to obtain clarification of utterances that they do not understand (Ibertsson, Hansson, Asker-Arnason, Sahlén, & Mäki-Torkko, 2009), this was not

observed in Lucas's conversational strategies. Instead, he redirected his mother's attention to the previous activity when he did not comprehend a newly introduced topic. Other than that, it is suggested that Lucas returned to a previous activity because of his inability to fully evaluate the contingency of his topic turn, thus resulting in the production of a non-contingent topic turn. Production of non-contingent topic turns has been documented extensively in children who presents with ASD (de Villiers, Fine, Ginsberg, Vaccarella, & Szatmari, 2007; Hale & Tager-Flusberg, 2005). While distinguishing the causes of Lucas's reinitiation of a previous activity was beyond the scope of this study, the following examples show how he redirected the focus of their activity to one that he had previously engaged in.

In Example 5.38, Lucas seemed to have missed his mother's TC (line 3) and therefore continued to talk about the previous topic (i.e., "Sugar for Ralph").

Example 5.38 (Lucas; T1: 3;7.13)

1	Mother:	and Ralph, we'll get Ralph	***(Topic: Sugar for Ralph.)***
2		some sugar [^ puts sugar into Ralph's cup].	
	Lucas:	Ralph gonna.	
3	Mother:	can you stir it for Cissy [^ points at Cissy's cup]?	***(Topic: Stirring their tea.)***
4	Lucas:	yes and Ralph has got some.	***(Topic: Sugar for Ralph.)***
5	Mother:	and Ralph has got some.	

In Example 5.39, Lucas's topic on juice (line 1) was not attended by his mother. Therefore, instead of collaborating with his mother's topic on "water" (line 2 to 4), he reinitiated the topic on "juice" (line 5).

Example 5.39 (Lucas; T1: 3;7.13)

1	Lucas:	the juice is gone xxx.	***(Topic: Juice.)***
2	Mother:	anyone else wants water?	***(Topic:Water.)***
3	Mother:	oh me me [=! Cissy's	
4		voice].	
	Mother:	Lucas.	
5	Lucas:	the juice is for Ralph [^ turns his gaze to Cissy].	***(Topic:Juice.)***

In the following excerpt, Example 5.40, Lucas's redirected the focus of their activity back to "plates" (line 3 and 4) after his mother's attempt to expand the activity, and this may be a result of inattention and/or lack of comprehension of his mother's question.

Example 5.40 (Lucas; T1: 3;7.13)

1	Lucas:	Cissy's green plate [^ turns is gaze to Cissy] .	***(Topic: Cissy's plate.)***
2	Mother:	ok what what does Cissy want on the green plate?	***(Topic: Food for Cissy.)***
3	Lucas:	Cissy's plate.	***(Topic: The teddies' plates.)***
4	Lucas:	and Ralph's plate.	

At T1, Lucas would also frequently reinitiate topics that were related to his favourite toy or stereotypical phrases. This resulted in premature termination of the preceding topic and an abrupt change in the activity or the focus of the activity. This behaviour, also known as perseveration or persistence with stereotypic/idiosyncratic phrases, has been reported as being common in children with ASD (Hale & Tager-Flusberg, 2005). For instance, in Example 5.41, Lucas had the tendency to abruptly switch the focus of their activity to Ralph (his favourite teddy bear) throughout their conversation.

Example 5.41 (Lucas; T1: 3;7.13)

1	Mother:	would anyone like a tomato?	***(Topic: Tomato.)***
2	Lucas:	Ralph [^ feeds Ralph with tea].	***(Topic: Ralph's tea.)***
3	Lucas:	Ralph is.	
4	Mother:	oh me please me me [=! Cissy's voice].	***(Topic: Tomato.)***
5	Mother:	I'd like a tomato [=! Cissy's voice].	
6	Mother:	there you go Cissy [^ puts the tomato in Cissy's bowl].	
7	Mother:	ok what does Cissy want on the green plate?	
8	Lucas:	Ralph is [= still feeding Ralph].	***(Topic: Ralph's tea.)***
9	Mother:	is he still drinking?	
	Later in the conversation, after 1:39 min		
10	Mother:	what would he like in his burger?	***(Topic: Making a burger.)***
11	Mother:	we've got some mustard and sauce.	
12	Lucas:	[^ puts a cup over Ralph's nose] oh he's stuck.	***(Topic: Ralph is stuck.)***

By T2, Lucas still reinitiated a particular topic of interest or an idiosyncratic phrase abruptly and resulted in an inappropriate termination of the preceding activity or topic. As shown in Example 5.42, he frequently returned to talking about one of the toy vehicles, Scoop (line 2 and 7).

Example 5.42 (Lucas; T2: 3;11.4)

1	Mother:	are we are gonna build something?	***(Topic: Building with the logs.)***
2	Lucas:	Scoop!	***(Topic: Scoop.)***
	Later in the conversations, after 5 seconds.		
3	Mother:	shall we build something with the logs?	***(Topic: Building with the logs.)***
4	Lucas:	yeah.	
5	Mother:	ok.	
6	Mother:	shall we build a ...+	
7	Lucas:	what for Scoop?	***(Topic: Scoop.)***

By T2, a change was noticed in the way Lucas switched to a previous activity. He did not reinitiate topics abruptly all the time but would sometimes attempt to respond to his mother before switching the focus of the activity. This indicates a change in his awareness of his intention to return to a non-contingent topic and on the obligation to complete his mother's communicative goals before introducing a new one. Lucas's ability to respond to his mother also indicates that he could concurrently provide information on one topic, and hold information from another topic in his memory space. In Example 5.43, while playing with the Bob the builder toys (i.e., toy vehicles) he responded to his mother's request that was of a different focus of attention before reinitiating the topic again (line 5).

Example 5.43 (Lucas; T2: 3;10.0)

1	Lucas:	Muck gonna go to xxx.	***(Topic: Muck.)***
2	Mother:	push this.	***(Topic: Pushing Roley.)***
3	Mother:	push this [^ pushes Roley].	
	Lucas:	ok.	
4	Lucas:	and xxx on Muck!	***(Topic: Muck.)***

To summarise, Lucas returned to a previous activity abruptly when there was a switch in the focus of the preceding activity, or as a result of his persistence to engage in a particular prop or script. This behaviour however changed by T2, and he was able to redirect his mother's attention to a preceding activity after he had ended the preceding topic appropriately.

(iv) Proposing a new activity

At T1, Lucas's proposal of a new activity was also the result of secondary effects of environmental factors such as distractions. For instance, it was noticed that Lucas abruptly introduced a new activity when he noticed a new item or event in the environment. In Example 5.44, he switched the focus of the activity to "knife" abruptly when he saw the toy knives.

Example 5.44 (Lucas; T1: 3;7.13)

1	Mother:	here's our spoons [^ takes	***(Topic: Spoons.)***
2		the spoons out].	
3	Lucas:	on the tea.	
4	Mother:	here we go, got a little spoon each [^ puts the spoons on the mat].	
5	Mother:	cause we have to stir the sugar, don't we?	
6	Lucas:	cut some knife first.	***(Topic: Knives.)***

Just like Linda, it was noticeable that Lucas proposed a new activity when he intended to end the preceding activity. However, at T1, other than abruptly ending the preceding activity all the time, Lucas would also end an activity appropriately with a disagreement or a negation before switching the focus of the activity to a new one. In Example 5.45, while playing with a toy bus, he informed his mother that he did not want to "turn the bus" (line 2) before initiating a new topic (line 4).

Example 5.45 (Lucas; T1: 3;7.13)

1	Mother:	turn the bus.	***(Topic: Bus.)***
2	Lucas:	I, I don't want to turn the bus.	
3	Mother:	oh!	
4	Lucas:	I, I want to turn, take the cups.	***(Topic: Cups.)***

At T2, Lucas persisted with the same strategies that he used at T1 when he proposed a new activity. For instance, he proposed a new activity upon being distracted by a related item or event in his immediate environment. Example 5.46 shows that while "playing planes" with his mother (line 1 to 4), he changed the focus of their activity to "Roley" upon seeing the toy.

Example 5.46 (Lucas; T2: 4;00)

1	Mother:	here I'll take off on this plane and you can take off on that plane.	***(Topic: Planes.)***
2	Lucas:	on that [^ takes the silver plane].	
3	Mother:	yep.	
4	Mother:	oh they need some fuels there.	***(Topic: Fuel for the planes.)***
5	Lucas:	Roley [^ takes Roley].	***(Topic: Roley.)***
6	Lucas:	we just lost Roley.	
7	Mother:	oh we lost Roley.	
8	Mother:	I thought Roley's watching.	

At the same time, by T2, it was also observed that Lucas would sometimes propose a new activity after ending the preceding one appropriately. In Example 5.47, Lucas and his mother were playing with toy vehicles and using a golf club, his mother pretended that they were blocked by a huge tree (line 1 to 2). Upon seeing the golf club, Lucas expressed his intention to "play golf" instead but this was expressed after he responded to his mother's request (line 3).

Example 5.47 (Lucas; T2: 4;02)

1	Mother:	oh no, there's a big tree in the way [= used the golf club as the pretend tree].	***(Topic: big tree in the way.)***
2	Mother:	how are we going to get over it?	
3	Child:	I [^ moves the golf club away].	
4	Mother:	oh, you're pretty strong.	
5	Child:	can I play with the ball of the golf club?	***(Topic: playing golf.)***
6	Mother:	oh, you're going to have the golf ball?	

To summarise, Lucas tended to propose a new activity upon noticing a novel object or event in his conversational environment. The analysis showed that he did so by abruptly changing the topic or by ending the preceding topic appropriately. The latter indicates capability in directing his mother's attention with adequate contextual cues.

5.3.4 Summary of Lucas's conversational strategies

Lucas's conversational behaviours at T1 appeared to be motivated by his intentions to reciprocate his mother's conversational topic turns and to advance the activities he was engaged in. As Lucas's language score on the PLS-4 was fairly appropriate for his age, he was able to contribute more specific linguistic information at baseline. However, his topic turn contributions at T1 were limited by his lack of pragmatic awareness. He had difficulty producing topic turns that were contingent on his mother's preceding topic turns when he wanted to expand or switch the focus of attention of an activity. However, his mother's constant scaffolding in the familiar activities that they engage in seemed to have facilitated positive changes in Lucas's use of topic turns. By T2, more contingent topic turns in activity expansion or activity switching were observed. His conversation with his mother was also characterised by his persistence in idiosyncratic phrases. This did not disappear at T2, but was produced with contingency in relation to the preceding topic turn.

At T1, Lucas collaborated well with his mother in the activities they engaged in. He used imitation and both topic maintaining responses with minimal and additional information to agree or disagree, to respond to his mother's directives and follow-in directives, and to make comments. These responses at this stage appeared to be similar in structure, as a result of repetitive prompting (i.e., through "priming" and questions) from his mother. By T2, he constructed topic turns with more linguistic information and therefore, appeared more precise when he referenced an event and his intentions. It is assumed that this development emerged with his concurrent language development, which further assisted in producing more contingent topic turns.

In expanding the focus of an activity, at T1, Lucas's conversational behaviours were also a secondary effect of activities that did not require a specific sequential flow, or were abruptly inserted event schemas built from his earlier experiences. Due to his limited ability to fully evaluate the degree of relatedness of these events, the effect was a non-contingent change in the focus of the activity (i.e., Example 5.35) at some times and a contingent expansion at other times (i.e., Example 5.36). By T2, these behaviours were still noticeable but a new strategy to expand an activity emerged. He was able to modify the elements in the utterances that he learnt to relate to the current activity or conversational context.

In shifting the focus of an activity to one that he had previously engaged in, at T1, his behaviours were also driven by factors such as inattention, limited comprehension or lack of

interest. When his mother did not attend to the activity he was engaged in, he would redirect her attention to that topic. Lucas's persistence in idiosyncratic subscripts or playing with his favourite toy character also resulted in constant reinitiation of a particular activity throughout a conversation. By T2, while he still presents with these behaviours, a new strategy in returning to a previous activity emerged. He would produce a topic turn to end the preceding conversational topic appropriately before redirecting his mother to that particular activity.

Finally, in proposing a new activity, at T1, Lucas's behaviour seemed to be motivated by three factors. The first factor was his intention to end the preceding activity. The second factor was incidental recall of events that were non-contingent with the preceding topic turn. The third factor was distraction by a new item or event in the surroundings. While Lucas would only end the preceding activity appropriately before returning to a previous activity at T2, he was already doing this for proposal of new activities at T1.

The findings from Lucas's conversational behaviours also suggest that the new behaviours that emerged at T2 were associated with his mother's scaffolding of topic turns. Topic turns that carry the function of formatting and prompting facilitated collaboration on an activity and expansion of the focus of an activity. Topic turns that switched his focus of attention on demand resulted in subsequent topic switching from him. Findings from Lucas's conversational data also suggest a relationship between topic turn construction and activity advancement. Topic turns that collaborate and expand an activity help the conversational participants to sustain that activity whereas topic turns that switch activities result in more activity switching.

Table 5.3 Conversational changes observed in Lucas

Activity type	Conversational behaviour	
	T1	T2
Collaborating on an activity	• Imitation	+
	• Agreement / disagreement with topic maintaining responses with minimal information.	+
	• Labelled with topic maintaining responses containing minimal information.	+
	• Responded to follow-in directives and directives with words and with unsolicited additional information.	+
	• Commented with topic maintaining responses containing minimal or additional information.	+
		• Used more types of utterances instead of stereotypical utterances.
Expanding an activity	• Production of topic turns was guided by the nature of the activity or game.	+
	• Recalled familiar events from event representations abruptly, which sometimes resulted in an abrupt and tangential topic change and sometimes a relevant topic extension.	+
		• Recalled subscripts but with modifications to relate to the current activity or event.
Returning to a previous activity	• Inattention to, lacked of comprehension of or uninterested in mother's newly introduced topic.	+
	• Previous topic unattended by mother.	+
	• Persistence in engaging in child's favourite prop or script.	+
		• Ended mother's topic appropriately then redirect mother's attention to the child's previous topic.
Proposing a new activity	• Commented on a novel object or event in the environment.	+
	• To end or change an activity.	+
	• Ended mother's topic appropriately then direct mother's attention to a new topic.	+

Note. – indicates that the behaviour was no longer observed at T2; + indicates that the behaviour was still observed at T2.

5.4 Discussion

The general framework of this study was to investigate the change in conversational strategies that Linda and Lucas used in joint activities with their mothers. It aimed to employ a microanalytical technique to describe the role of child contributions when they collaborated on an activity, expanded the scope of an activity, returned to an activity that they had previously engaged in and proposed a new activity, within the context of familiar activities. The possible effects of scaffolding were also identified. In the four types of joint activities (i.e., collaborating on an activity, expanding an activity, returning to a previous activity and proposing a new activity), similarities and differences in the execution of these behaviours were observed in the children. However, for both children, their behaviours indicated an increase in relevance with their mothers' topic turns and the activity they were engaged in.

The first objective of this study was to investigate how these two children collaborate on joint activities. Both presented with conversational behaviours that have been documented in children with typical development i.e., imitation, agreement/disagreement, answering follow-in directives and directives, and labelling (Keenan & Schieffelin, 1976; Ninio & Snow, 1996) at T1. The use of these strategies also showed they were able to coordinate topic turn taking with their mothers to accomplish the goal of the activity (H. H. Clark, 1992) despite having compromised conversational abilities. The differences in their topic turns reflect their language capability and how language abilities affect the quality of children's conversational topic turns. While Linda was also using vocalisations to maintain the conversation at T1, Lucas used mainly words and sentences to do so.

By T2, both children were able to collaborate on activities with specific linguistic information and were using either words or word combinations. The changes observed in Linda's conversational behaviours by T2, as she changed from responding with vocalisations to responding with words that contain specific linguistic information showed a shift from contributing non-substantive topic turns to substantive topic turns. The changes in Lucas (i.e., making references using more types of linguistic elements at T2) showed a shift within substantive topic turns but with even more information. These findings suggest that increase in language skills facilitate their development of pragmatic skills such as increasing relevance and providing more precise information in conversations to help their mother comprehend them better.

The children's increasing ability to collaborate on activities also appeared to be an effect of their mothers' scaffolding of scripted conversations. The mothers' repetitive use of certain topic turn structure or "priming" episodes (L. B. Leonard, 2011) and follow-in directives seemed to prompt the children to produce similar structure to advance the conversational topics or when the same topic was reinitiated later in the conversation or in another conversation. Priming represents linguistic routines, models the linguistic elements of an activity for a child even when the topic is raised another time (Lucariello, 1990). Furthermore, priming may structurally elicit the expression of a topic turn that has the same syntactic structure as the mother's utterance but with nouns, verbs and/or prepositions that differ from the mother's utterances (L. B. Leonard, 2011). Other than priming, follow-in directives in mother's speech such as wh-questions also facilitate the selection of relevant linguistic elements from the child (Lucariello, 1990; Ornstein, et al., 2004; Ratner, 1984). Both formatting and wh-questions also serve to reduce the degrees of freedom with which a child has to cope, thus focusing the child's attention into a manageable domain (Lucariello, 1990).

The second objective of this study was to investigate how the children expanded joint activities. Both children were guided by activities that had a repetitive nature or did not consist of any specific sequential order. Just like scaffolding from their mothers, these activities provided contextual cues that helped them to shift the focus of the activity to another contingently. Therefore, when the children changed the focus of an activity but were still engaged in that activity, or repeated the activity with minor variations, an expansion of the activity was observed.

Second, expansion of an activity was an effect of learning from scaffolding provided by their mothers. In activities that require a sequential order, the children expanded them by using similar scripts that their mothers had repeatedly used either before the conversation or in other conversations. For Linda, this started with expansion of activities via physical actions and she later progressed into repeating actions or verbal topic turns from similar activities without much modification to suit the context of the current activity. It has been claimed that knowledge about non-verbal behaviours such as physical actions of an event are easier to access, retrieve, store and manipulate than linguistic knowledge (Lucariello, 1990). In addition to repeating actions, at T1, expansion of a joint activity for Linda was also achieved via making categorical associations between the preceding activity and another item or event in her environment. By T2, she was making more types of associations and would request a

role swap with her mother resulting in an expansion of their current joint activity. It was argued that children's early event representation is formed by differentiation of categories of objects, participants, and actions and by realising which element can be generalised into similar slots in a new event (Duchan, 1991). While the three behaviours identified from Linda's conversational data suggest that communicative goals such as making categorical associations, varying physical actions and swapping roles facilitated the production of topic extensions and access to relevant linguistic units, for Linda, requesting a role swap appeared as a behaviour that emerged at a later stage.

By T2, in her attempts to expand an activity, Linda also exhibited a strategy that Lucas was already producing at T1. This strategy involved retrieval of subsequent actions from their internal representations, of similar past experiences, as shown in Example 5.14 and Example 5.35. In these examples the children were not competent in incorporating these past experiences contingently to relate to the subtle variations in the current context. Fivush & Slackman (1986) argued that children become increasingly flexible at reorganising scripts with age. They reported that at 4 years old, children are only able to "read off" their internal representation but unable to use acquired scripts to construct any novel episode or when there is no conflict between the organisation of the current task and their internal representation. Flexibility at reorganising scripts was noticeable in Lucas by T2 (e.g., Example 5.36), with learnt topic turn structure that consisted of changed variables, after repeated scaffolding from his mother.

In facilitating expansion of activities, both mothers used strategies such as TEs and facilitative techniques such as expansions, follow-in questions and follow-in cloze procedures. Following these strategies, it was noticed that the children tended to reinitiate these activities immediately after they were shown or prompted or when they encountered a similar experience in another activity. Therefore, it is suggested that through this scaffolding process, the children's production of topic extensions became more noticeable after a period of time. This was evident in the quantitative analysis of their production of topic extensions (see Chapters 3 and 4). The rates of TEs by the children were significantly higher than their baseline rates towards the end of intervention and post-intervention. The use of TEs showed that the children were able to shade the focus of an activity without violating relevance in their interaction.

The last two objectives of this study concerned topic changing. The third objective was to investigate how the children returned to a previous activity and the fourth objective was to investigate how they proposed a new activity in conversations. In the conversational data, while the children's inattention, lack of comprehension or lack of interest, and the mother's inattention to their preceding topic turns appeared as antecedent factors for their return to a previous activity, these factors also prompted Linda to propose new activities. Instead of switching their focus of attention to the newly introduced activity, the children appeared to ignore or miss their mothers' non-contingent topic turn and produce another non-contingent topic turn. These findings support the idea that cognitive processing required to change an individual's attention to a new topic is higher than cognitive processing required to stay in the current focus of attention (McCarthren, et al., 1995; K. E. Nelson, 1989; Tomasello & Farrar, 1986). As a switch in activity also occurred when the children produced a non-contingent topic turn because of their lack of comprehension of their mothers' utterances and/or inability to fully evaluate the relevance of their non-contingent topic turn, it is important that mothers are able to fine-tune their conversational topic turns to ensure that they keep the conversational environment within their children's zone of proximal development (Vygotsky, 1978). Although Rocissano & Yatchmink (1984) did not find any significant correlations between topic switching by mothers and children, McTear (1985) claimed that topic reinitiation could occur when the child did not receive a satisfactory response. In general, the data on activity switching suggest that children switch their focus of attention in conversations when there is a lack of scaffolding. This is unlike collaboration on activities and expansion of joint activities, which occur through conversational scaffolding.

In returning to a previous activity, Lucas differed from Linda in that he had a tendency to reinitiate idiosyncratic scripts or persist in his favourite activity, several times in the conversation. He would reinitiate topics abruptly because of his interest in these topics. This behaviour has been reported as perseveration (de Villiers, et al., 2007) and stereotyped/idiosyncratic words or phrases (Hale & Tager-Flusberg, 2005) and is documented as common in children with ASD. While this behaviour persists by T2, a change was noticed in the way he reinitiated a particular activity. This new strategy involved a topic turn that ended the preceding activity, followed by a reinitiation of an activity. The awareness to end a preceding activity before introducing a new activity through a non-contingent topic turn was also noticed in Linda's conversational behaviours by T2. Instead of using this strategy to reinitiate an activity, she used it to propose a new activity.

The use of this strategy suggests increasing relevance in the children's topic turn production before they express their intention to switch an activity. As they end an activity with a negation to discontinue the preceding activity or with a response to comply with their mother's requests as demonstrated in Example 2.24, Example 5.44 and Example 5.45, they showed better awareness of their intention to change to another activity. A negation provided contextual cues that a new activity might be on the way while a response to their mothers' request indicates that they knew they should not leave the preceding topic hanging. Concurrently, their intention to end the preceding activity might imply that they were no longer interested in that topic or had exhausted their topic turns for that topic.

Another possible factor that might have contributed to their motivation to end an activity appropriately before proposing a new activity, is that the children were able to simultaneously process information on one topic and to maintain information of another topic in memory. This ability may be partially related to the attentional component of children's working memory. As working memory deficits have been associated with children with Down syndrome (Jarrold, et al., 2006) and to a lesser extent in ASD (Jarrold, et al., 2006), the emergence of this new strategy showed that conversational practice may help these two children's skills in this area and help them to produce topic turns with higher relevance even in switching topics.

In proposing new activities, it was also noticed that the children would produce non-contingent topic turns to talk about a newly encountered item or event, or when they suddenly recall an event that was non-contingent with their preceding activity. While an abrupt change in conversational topic or an abrupt introduction of an activity is also found in typical conversations, frequent use of topic turns that switch the activities within a conversation may indicate a lack of awareness in sustaining joint attention. As comprehension and execution of topic turns in conversations involve cognitive skills, frequent change in activity as a result of distraction in the environment may suggest lack of cognitive maturity. The children in this study presented with diagnoses that are related to joint attentional difficulties (Abbeduto, et al., 2007; Schertz & Odom, 2004; Yoder & McDuffie, 2008), which could have affected their ability to maintain a particular topic.

Finally, the findings from both children suggest that the way an activity advances depends on the conversational topic turns produced. This involves expression of the participants' intentions, the coordination of their topic turns, and the cognitive processing

involved in carrying out those intentions (H. H. Clark, 1992). The focus of an activity remains within its boundaries when topic maintaining topic turns are produced; the focus of an activity shifts from one to another relevantly when topic extensions are produced; and activities are switched more frequently as a result of frequent topic changes.

5.5 Clinical implications

The findings of this qualitative study suggest that frequency counts should be complemented with a qualitative analysis on how the children change their topic manipulation skills. This would provide more information to help clinicians modify environments to improve children's conversational skills. The findings support the use of familiar activities and routines to scaffold topic turn acquisition which subsequently facilitates the production of relevant topic turns across time. Routines also provide contexts for children to talk about past and future events (Lucariello, 1990). This in turn, may help children to comprehend their mothers' actions, predict the next action of an activity and then act as they had predicted (Fivush & Slackman, 1986). The findings also support the concept of following the child's lead in conversations, to help children collaborate or expand an activity especially with children who have a slower processing speed. Another clinical implication that could be drawn from this study is that the amount of materials in the activity the mother and child are engaged in may be limited to help children to sustain an activity. At the same time, systematic increase of activity materials may help the child to become increasingly more assertive in conversations.

5.6 Limitations and directions for future research

This study is a descriptive study of the conversational behaviours observed from two children with pragmatic difficulties. While this qualitative analysis describes the complex nature of the children's conversational behaviours and suggests possible attributes to these behaviours, the analysis was done within social contexts that were specific to the children and the activities that they engaged in. To further examine the relationships between conversational topic turns and the strategies described here, it is suggested that more rigorous

experimental studies be used. It is also suggested that these data be compared with other related conversational data (i.e., children with typical language development). Such comparisons may allow for identification of topic related pragmatic behaviours that are distinct or lacking in children with pragmatic difficulties, and subsequently the provision of appropriate support for topic-related pragmatic behaviours.

5.7 Conclusion

The quality of children's conversational development reflects an increase in pragmatic competence, language levels and mother's conversational scaffolding. It also reflects the children's performance in an activity.

CHAPTER 6

STUDY 4

THE EFFECTS OF EXPANSION, WH-QUESTIONS AND CLOZE PROCEDURES ON CHILDREN'S CONVERSATIONAL SKILLS

6.1 Introduction

The benefits of follow-in comments (e.g,. expansions) and follow-in directives (e.g., wh-questions and cloze procedures) in child-directed speech (CDS) have been widely documented (Bellon-Harn, et al., 2004; Bradshaw, et al., 1998; Girolametto, et al., 1999; Loeb & Armstrong, 2001; McDuffie & Yoder, 2010; Yoder, et al., 1995). These facilitative techniques have been shown to be correlated with a range of measures of language acquisition (Akhtar, et al., 1991; Fewell & Deutscher, 2004; Fletcher, Cross, Tanney, Schneider, & Finch, 2008; Girolametto, et al., 1999; McDuffie & Yoder, 2010; Rollins, 2003; Tamis-LeMonda, et al., 2001; Trautman & Rollins, 2006) and to improve social-communication, perspective taking, and social-emotional regulation (Bornstein, et al., 2008; Crowe, Norris, & Hoffman, 2004; Pennington, et al., 2009; Raver, 1996). It was claimed that the use of these techniques may be compromised in mothers of children with conversational difficulties because of lack of verbal feedback from their children (Conti-Ramsden, 1990; Curcio & Paccia, 1987). This may further compound their children's difficulties. Therefore, many language intervention programmes include the teaching of the use of language facilitation strategies to mothers and reported that the efficacy of these mother training programmes include helping mothers to improve their use of facilitative techniques (Aldred, et al., 2004; Dale, et al., 1996; Girolametto, et al., 2007; Girolametto & Weitzman, 2006; Hancock, et al., 2002).

While the use of these techniques in isolation has been investigated, there is limited data on the use of these techniques in combination. It was found that combination of facilitative techniques occurs in CDS. For instance, two-part turnabouts that consist of a combination of a follow-in commenting and a follow-in directive (e.g, "Yeah, what's this?", "You like that, huh?") is commonly used in CDS of mothers of two year old children and

these turnabouts are argued to elicit more contingent responses than other types of turns, from two year old children (Kaye & Charney, 1980, 1981). In an experimental study, Yoder et. al (1994) employed two conversational styles with young children: (i) follow-in commenting combined with follow-in directives in the form of wh-questions; and (ii) follow-in commenting only. They found that follow-in questions prompt children to construct more semantically relevant and syntactically complex responses and higher frequencies of contingent responses in conversations. Similarly a different type of follow-in directive, cloze procedure, was combined with expansion and shown to result in more semantically complex responses than questions and model answers (Bradshaw, et al., 1998) and contrast word procedures (Bellon-Harn, et al., 2004). These studies however, did not compare the effects of combined facilitative techniques with single techniques.

Although there appear to be benefits in combining follow-in commenting with follow-in directives, it is still not known whether certain combinations are superior in scaffolding the development of conversational skills, particularly in children with developmental delays and disabilities. Children with Down syndrome, autism spectrum disorder (ASD), and specific language impairment (SLI) all have poor conversational skills (Abbeduto, et al., 2006; Botting & Adams, 2005; Liiva & Cleave, 2005; J. E. Roberts, Martin, et al., 2007) which impact negatively on their language development (Shumway & Wetherby, 2009; Yoder, 2006) and social skills (Brinton, et al., 1998; Guralnick, Connor, & Johnson, 2011). Because CDS techniques are used in combination in typical caregiver-child conversations, it is important to understand how they can be exploited in a therapeutic context. In this study the follow-in commenting strategy of expansion alone (EA) will be compared with expansion combined with a wh-question (EQ) and an expansion combined with a cloze procedure (EC).

While the effects of expansion have been relatively well–studied, less is known about the effects of EA versus EQ or EC. Given that each technique is independently associated with improvements in children's conversational skills, it would be expected that expansion combined with either of the other two techniques would also have a positive outcome. In particular, it would be hypothesized that expansion combined with a follow-in wh-question or cloze procedure, which provides linguistic mapping, novel but relevant information and an expectation for the child to respond contingently would improve their ability to maintain and extend conversation more than EA. The aim of this study was to provide some preliminary data on the effects of EQ and EC on the conversational ability of young children with language deficits. Specifically, the following questions were addressed: "Does the use of EQs

or ECs result in (i) more topic extensions (TEs)?; (ii) more verbal topic maintaining responses (verbal TM)?; (iii) more non-verbal topic maintaining responses (non-verbal TM)? and (iv) fewer non-relevant responses (NR) than EA?"

6.2 Methods

6.2.1 Participants

Eight children (4 boys and 4 girls; mean age=53.63 months, SD= 4.44) were recruited from a general multidisciplinary intervention programme at the Champion Centre. Criteria for inclusion were: (i) being between the age of 36 and 60 months; (ii) having been clinically identified as having pragmatic delays sufficient to meet criteria for individualised targeted programmes for pragmatic development; (iii) having vision and hearing levels within normal limits at the time the study was conducted; (iv) being native speakers of English; and (v) performing at least 1.5 standard deviations (SD) below the mean in the Preschool Language Scale - Fourth Edition (PLS-4; Zimmerman, et al., 2002). Table 6.1 summarises the individual standard PLS scores at entry into the study and children's diagnoses.

In this study, the child participants presented with a range of diagnoses. The heterogeneity of the treatment group acknowledges that there is considerable variation in pragmatic abilities within diagnostic categories such that children with the same diagnosis do not necessarily present with exactly the same pragmatic difficulties and children with quite different diagnoses can present with pragmatic difficulties in common. For example, both children with Down syndrome and those with ASD have been found to have difficulties with contingent contributions to conversations (Hale & Tager-Flusberg, 2005; J. E. Roberts, Martin, et al., 2007). It is thus important to identify which types of pragmatic scaffolding are effective across diagnostic categories.

Table 6.1 The children's PLS-4 standard scores

ID	Chronological age in months	Clinical diagnosis	Standard score (SS)	
			Receptive language	Expressive language
1	50	Down syndrome	77*	83
2	49	Down syndrome	65**	72*
3	57	Down syndrome	56**	63**
4	52	Down syndrome	61**	62**
5	57	Unbalanced translocation and monosomy 9p syndrome	50***	59**
6	56	ASD	78	76*
7	60	ASD	93	76*
8	48	Down syndrome	50***	50***

Note. ID=Identification number; Mean of SS=100; SD=15; *=–1.5SD, **=– 2SD and ***=–3SD.

6.2.2 Procedure

Three speech-language therapists (SLTs) familiar with the use of facilitative techniques in their clinical practice conducted the experimental sessions. These were preceded by training sessions and hands-on practice to ensure consistency of use. The experimental sessions were incorporated into the children's regular intervention programme by their attending SLTs who conducted the interaction sessions in a quiet room at the early intervention centre.

The protocol for the experimental sessions was adapted from Yoder, Davies, Bishop, & Munson (1994). First, a predetermined set of items (two story books, a set of building blocks, a set of toy cars, a set of doll house toys and a tea set) was displayed on a table situated in front of the child. The SLT was instructed to allow the child to pick a preferred item on the table, and to switch items any time during the session. The SLT was instructed to remain silent initially so the child could initiate the conversation first. When the child did so, the SLT continued the child's topic using one of these: EA, EQ, or EC in five minute blocks of interaction; the switch from one technique to another being dictated by the researcher. If the child did not initiate the conversation or was silent for 15 seconds, the SLT then talked about the item by relating it to the previous conversational topic. Irrespective of the facilitation technique in progress, the SLT was asked to wait for at least 2 seconds to allow

the child to take a conversational topic turn. They were also instructed to avoid initiating or switching conversational topics or using yes/no questions. The instructions were displayed on the wall of the room for easy reference by the SLTs. Each child participated in two experimental sessions at least one week after an initial familiarisation practice session. The order of the techniques was counterbalanced across all participants and sessions. The mothers of the children were usually present in the room but were instructed to remain passive to allow maximal interaction between the SLT and the child. Table 6.2 summarises the coding categories of the techniques used and provides examples from the data collected in this study. The sessions were recorded using a Panasonic digital video camera; model SDR-H250GN-S.

Table 6.2 Definitions and examples of the facilitative techniques used by the SLTs

Code	Definition	Example
Expansion alone (EA)	Immediate repetition of the child's utterance with the addition of semantic or grammatical information.	Child : mm empty. SLT : mummy's cup is empty. Child : mouses. SLT : mice.
Expansion combined with wh-question (EQ)	An expansion followed immediately by a wh-question that is related to and/or extends the topic of the preceding topic turn.	Child : he needs to put his shoes off. SLT : she needs to take her shoes off. SLT : why does she need to take her shoes off?
Expansion combined with cloze procedure (EC)	An expansion followed immediately by an utterance produced by incomplete utterance that ends with a significant pause.	Child : to the museum. SLT : a museum in Wellington. SLT : we need to fly on a ..?

The investigator transcribed the experimental interactions according to the CHAT conventions described in Chapter 2, and coded the transcripts using the conversational coding system described in Chapter 2. In this study, the dependent variables were children's TEs, verbal TMs, non-verbal TMs and non-relevant responses (NRs). These outcome measures

were used to investigate the children's ability to extend and maintain conversational topics following each of the facilitative technique.

6.3 Reliability of transcription and coding

Accuracy of the transcriptions and coding was verified by two independent transcribers/coders against the original videos. Disagreements were noted and resolved through discussions with the original transcriber (Girolametto, et al., 2007; Johnston, 2001). Consensus reliability was conducted on all transcripts before any adjustments were made, using the formula: number of agreements/(the number of agreements + disagreements) X 100%. Consensus reliability for transcription of the SLTs' utterances was 97.30% (*N*=2033) and children's utterances was 97.02% (*N*=1780).

Across all the five minute transcripts, consensus reliability for the coding of EA was 96.33% (*N*=164); reliability for the coding of EQ was 92.21% (*N*=77); reliability for the coding of EC was 96.23% (*N*=106). Consensus reliability for the coding of the SLTs' conversational topic turns as EA transcripts was 98.68% (*N*=912); EQ transcripts was 89.61% (*N*=518); and EC transcripts was 99.10% (*N*=556). Consensus reliability for the coding of the children's conversational topic turns as EA transcripts was 98.44% (*N*=900); EQ transcripts was 99.13% (*N*=460); and EC transcripts was 98.59% (*N*=711).

6.4 Results

The outcome measures analysed were the percentage of topic extensions (TEs), verbal topic maintaining responses (verbal TMs), non-verbal topic maintaining responses (non-verbal TMs), and non-relevant responses (NRs) produced by the children. The following formula was used to obtain the percentage of these topic turns: type of topic turn/total responses to the predetermined facilitative technique x 100%. One-way repeated measures ANOVA was performed to determine the eight children's conversational topic turns in response to each of these different facilitative techniques. Then, paired sample t-tests, with a Bonferroni adjusted alpha levels of 0.017 (0.05/3) were used to follow-up on the main effect

of facilitative techniques. Table 6.3 presents the results of the analysis. The percentage of conversational topic turns produced by each child following each facilitative technique is presented in the Appendix G.

Table 6.3 Main effects of child conversational topic turns across each facilitative technique.

Child variable	**Group *F***	**EA** **M (SD)** *N*=8	**EQ** **M (SD)** *N*=8	**EC** **M (SD)** *N*=8
Topic extension (TE)	*F*(2,14) = 19.442*, p = 0.000	18.959 (7.481)	0.000 (0.000)	5.768 (8.270)
Verbal topic maintaining response (verbal TM)	*F*(2,14) = 2.81, p = 0.76	69.85 (13.26)	49.79 (15.24)	61.24 (23.52)
Non-verbal topic maintaining response (non-verbal TM)	*F*(2,14) = 5.535*, p = 0.017	16.646 (9.512)	12.583 (13.416)	3.045 (6.128)
Non-relevant response (NR)	*F*(2,14) = 10.903*, p = 0.001	0.000 (0.000)	28.928 (20.598)	33.948 (27.614)

Note. *p<0.05; EA= Expansion alone; EQ = Expansion combined with wh-question; EC = Expansion combined with cloze procedure.

A significant effect across the three facilitative techniques was found in topic extension [*F*(2,14) = 19.442, p = 0.000]. Pairwise comparisons revealed that TE following EA (M=18.959, SE=7.481) is significantly higher than following either EQ or EC. While EC prompts led to a mean of 5.768 (SD=8.270) topic extensions over the five minute period, EQ did not elicit any topic extensions (M=0.000, SD= 0.000).

Analysis of children's TMs revealed two findings. First, there was no significant effect observed in the children's production of *verbal* TMs following any of the three techniques [*F*(2,14) = 2.81, p = 0.76]. Second, a significant effect was observed in the

children's production of *non-verbal* TMs across the three techniques, [$F(2,14) = 5.535$, $p = 0.017$]. Pairwise comparisons between the techniques for child non-verbal responses showed that, in a five minute interaction session, EA elicited significantly more non-verbal TMs (M=16.646, SD=9.512) than EC (M=3.045, SD=6.128).

Although the occurrence of NRs was lower than the total frequency of topic extensions and topic maintaining responses, a significant effect was found for NRs across the three techniques [$F(2,14)=10.903$, $p =0.001$]. Pairwise comparisons revealed that the occurrence of NR was significantly lower following EA than either EQ or EC. In fact, none of the children had any occurrence of NR following EA (M=0.000, SD=0.000). The difference between EQ (M=28.928, SD=20.598) and EC (M=33.948, SD=27.614) was not significant.

6.5 Discussion

This study aimed to examine the effect of three types of language facilitation techniques on the verbal and non-verbal topic turns of children with language-delay. Specifically, the following questions were asked: Does the use of expansion combined with either wh-questions (EQ) or cloze procedures (EC) result in (i) more TEs; (ii) more verbal TMs; (iii) more non-verbal TMs, and (iv) fewer NRs than expansion alone (EA)?

In relation to the first question, it was predicted that EQ or EC would result in more TEs than EA. This was not supported by the findings. Suprisingly, the combinatory techniques resulted in fewer TEs despite the fact that follow-in questions and follow-in cloze procedures have been shown to be positively associated with contingent topic turns by previous studies. This is suggested because Yoder and colleagues (1992; 1994) included all types of follow-in comments in their study, whereas the current study only examined expansion. Similarly, while Bradshaw et al. (1998) demonstrated that questions elicited more verbal topic turns than expansion, questions were analysed in isolation rather than in combination with expansion as here. Based on these findings, it is suggested that EA is more effective than EQ or EC because the combined techniques may place a greater load on the children's conversational and linguistic skills than EA.

To extend a topic, children have to understand what is a relevant next contribution and plan their utterances accordingly (Sperber & Wilson, 1995). Each of the three techniques used in this study guides this planning in different ways and it may be that a combination of techniques, rather than helping the child actually confuses them, making it harder to plan and produce an appropriate next utterance. In particular, both EQ and EC constrain the child's next utterance narrowly by requiring an answer or a completion to a very specific expression. They also come with a heavy expectation of a response which is not the case for EA. Expansion also allows the child much more latitude for response and therefore places less of a burden on the child's processing mechanism. Expansion provides children with language they can reuse in their own utterances, which again reduces the cognitive load; whereas questions and cloze procedures often call for answers or responses that cannot be retrieved from the preceding conversation.

Examples of TEs following EAs are shown in the excerpt below (Example 6.1) in which the child formulated TEs from the SLT's expansions and the topics were related to the activity of their conversation:

Example 6.1

1	Child:	Annie eat it.		(Topic: Child is eating)
2	SLT:	Annie eat carrot.	***EA***	
3	Child:	teddy eat it dinner [^ feeds teddy]	***TE***	(Topic: Child feeds teddy)
4	Child:	eat.		
5	SLT:	teddy, eat dinner.	***EA***	
6	Child:	no, I kiss.	***TE***	(Topic: Child kisses teddy)
7	SLT:	I kissed teddy.	***EA***	
8	Child:	kiss [^ puts teddy on SLT's face].	***TE***	(Topic: SLT kisses teddy)
9	SLT:	kiss teddy, oh gentle [^ kisses teddy].	***EA***	

Another possible explanation for the failure to find an advantage for EQ and EC in TE is that the EQs and ECs produced by the SLTs may themselves have functioned as TEs

(Yoder & Davies, 1992; Yoder, Davies, et al., 1994). An examination of the SLT's EQs and ECs showed that most of those topic turns consist of additional information that itself shifts the topic of the preceding conversational topic. Therefore the child's role at this point is to maintain that newly extended topic rather than providing another TE. For instance, in the following excerpt (Example 6.2), the SLT's EQ (line 2 and 3) extended the topic on "dolly" with a question that specifically requires an answer related to 'dolly's action' from the child's next topic turn.

Example 6.2

1	Child: here.		(Topic: Dolly)
2	SLT: dolly's here.		
3	SLT: what's dolly doing?	***TE***	
4	Child: shoes [= taking dolly's shoes off].	***Verbal TM***	(Topic: Taking dolly's shoes off)

In support of this interpretation, follow-in questions have been demonstrated as effective prompts to assist in retrieval of information from the child's linguistic and event representation (Ornstein, et al., 2004) for topic maintenance. This may explain why, in answer to the second question posed in this study, it was found that all three techniques seemed to work equally well to support ***TM*** but EA worked better than the other two to support *initiations of TE*s. This interpretation is supported by the findings of previous studies that showed adult follow-in comments and follow-in directives help children to provide conversational turns that are semantically relevant (Bellon-Harn, et al., 2004; Bradshaw, et al., 1998; Girolametto, 1988; McDuffie & Yoder, 2010; Yoder & Davies, 1990; Yoder, Davies, et al., 1994).

The third question addressed was whether the use of EQ and EC would result in more non-verbal topic maintaining responses than EA. However, the data showed that production of non-verbal topic maintaining responses was significantly more frequent following EA than EC and non-significantly more frequent following EA than EQ. A possible explanation for low non-verbal topic maintaining responses following EC is that ECs constrain the legitimate response so tightly to a verbal response that a non-verbal response is rarely relevant, whereas a non-verbal response to EA is more easily seen as a relevant continuation of the conversation.

The final question was whether the use of EQ and EC would result in fewer NRs than EA. Although the absence of relevant responses was low following all three techniques, it was significantly lower following EA as compared to both EQ and EC. While NRs are hard to interpret, they may reflect a range of possibilities including failure of comprehension (Leinonen, et al., 2000, pp. 140--154), inattention (M. A. Leonard, Milich, & Lorch, 2011), or difficulty in referring accurately (Schelletter & Leinonen, 2003).

6.6 Clinical implications

The preliminary findings of this study suggest that clinicians can strategically select the type of linguistic input that they provide to encourage children's conversational skills. While all three techniques facilitated the production of contingent topic turns from children with language delay and pragmatic difficulties, they also varied in their capacity to elicit conversational topic turns from children. In scaffolding pragmatically more complex topic turns, clinicians may need to explore whether any given child needs to have his or her verbal topic maintenance responses increased, in which case all three techniques are fine, or whether the child is ready for focused work on TE, in which case EA is an appropriate focus. The training of these techniques could be extended to video-feedback sessions which have been shown to result in better training efficacy than direct training, and are a cost-effective way of providing a standardised intervention protocol (Arnold, et al., 1994; van Balkom, Verhoeven, van Weerdenburg, & Stoep, 2010).

The findings of this study also suggest that similar facilitation styles can be provided to children with conversational difficulties across diagnostic categories because they may have common underlying deficits such as poor joint attentional skills (Tomasello, 1988) and poor memory skills (Ornstein, et al., 2004). For example, delay in joint attentional development has been reported in children with Down syndrome and ASD (Abbeduto, et al., 2007; Schertz & Odom, 2004; Shumway & Wetherby, 2009); and working memory deficits have been reported in children with ASD, Down syndrome, and specific language impairment (SLI) (Belleville, Ménard, Mottron, & Ménard, 2006; Briscoe & Rankin, 2009; Jarrold, et al., 2006). However, although similarity in underlying deficits across diagnoses may explain the similarities in the children's responses to the facilitative techniques, this argument is made with caution because of the wide functional range of these precursors in the development of

children's language and social communication skills, and the extent of impairment of these precursors in different clinical populations.

6.7 Limitations and directions for future research

The current study has been limited by the small sample size. So generalisability calls for replication using a larger sample, and all findings should be interpreted with caution. It would also be preferable to explore the use of the techniques delivered by a larger number of SLT's to determine the general effectiveness of the training and implementation. Obtaining data on longer interactions to obtain more adult-child adjacent pair of utterances for analysis would also be desirable. As the SLTs in this study already used expansion as a facilitative technique in their practice and the children in the study may therefore have already had familiarity with it, it would also be good to examine children newly exposed to the techniques studied here. Finally, the impact of different cognitive developmental levels as well as close analysis of the language levels of each child and exploration of the possibility of precise matching of the linguistic levels of the responses to those levels in order to encourage linguistic development could also be explored.

CHAPTER 7

GENERAL DISCUSSION

7.1 Introduction

This thesis examined the changes in children's conversational topic turns, in relation to the conversational topic turns and facilitative techniques used by their caregiver or SLT. Chapter 1 reviewed past studies in the literature pertaining to the development of children's conversational skills and intervention approaches for children with conversational difficulties. It is widely reported that early caregiver-child interactions build the foundations for the development of children's conversational skills and continuously scaffold this development throughout several developmental stages (Gogate & Hollich, 2010; Greenspan & Shanker, 2007; Ninio & Snow, 1996; Snow, 1999; Tomasello, 1988). It is shown that children's conversational skills develop mutually with their language, cognitive and social emotional skills (Givón, 2003; Greenspan & Shanker, 2007; Ornstein, et al., 2004; Ratner, 1984; Snow, 1999; Thompson, 2006; Tomasello, 2000). Caregiver's language input in caregiver-child conversations, also known as child-directed speech (CDS; Saxton, 2008), contains several types of contingent responses and facilitative techniques that help children to process and integrate information that they regularly receive with new information, using the least cognitive effort (Gogate & Hollich, 2010; K. E. Nelson, 1989; Sperber & Wilson, 1995). Consistent use of CDS has been shown to facilitate children's conversational skills (Curcio & Paccia, 1987; Girolametto, 1988; Girolametto, et al., 2007; Yoder, Davies, et al., 1994), which subsequently stimulates the caregivers to fine-tune their language input to match their children's continuous development (Harrist & Waugh, 2002; Snow, 1996). This is in line with the social-interactionist theory (Bohannon & Bonvillian, 2009) and transactional model (Sameroff, 2009). Intervention procedures based on these approaches focus on training caregivers to use naturalistic conversational-based strategies to improve children's conversational and other language aspects (Norris & Hoffman, 1990b; Wilcox & Shannon, 1998). While these interventional studies document improvements in caregivers' scaffolding skills and children's ability to initiate and maintain interactions and other language skills (e.g., Fey, et al., 2006; Girolametto, et al., 2007; Girolametto & Weitzman, 2006; Mahoney, et al., 2006; Warren, et al., 2006), there is limited data on the changes in children's ability to

achieve conversational contingency through their caregivers' conversational topic turns and facilitative techniques. Therefore, this thesis aimed to address this issue with the following questions:

1. What is the impact of caregiver training intervention programmes on caregivers' conversational topic turns [i.e., topic change (TC), topic extension (TE) and topic maintaining response (TM)] and facilitative techniques (i.e., imitation, expansion, follow-in cloze questions, and follow-in cloze procedures)?
2. What is the impact of caregiver training intervention programmes on children's conversational topic turns (i.e., TC, TE and TM)?
3. How do facilitative techniques (i.e., imitation, expansion, follow-in questions and follow-in cloze procedures) impact children's conversational skills? That is, does the use of facilitative techniques by caregivers in naturalistic environments result in higher rates and more complex use of child contingent topic turns (i.e., TE and TM), or does combining these techniques in a contrived setting enhance children's rates of contingent topic turns?

To answer these questions, conversational data of preschool aged children with identified conversational difficulties interacting with adults, either their primary caregivers or speech-language therapists (SLTs), were video-recorded, then transcribed and coded using the methodology described in Chapter 2. All conversational data for this thesis were then transferred into digital files for transcription using Transana 2.3 (Woods & Fassnacht, 2008). Transcription followed the CHAT format and conventions (MacWhinney, 2000). A conversational coding system and a facilitative technique coding system that are in line with the principles of adjacency pair in Conversation Analysis (CA; Sacks, et al., 1974; Schegloff, 1996) and Relevance Theory (RT; Sperber & Wilson, 1995) were adapted from a series of coding systems documented in the literature (Bellon-Harn, et al., 2004; Bradshaw, et al., 1998; Brinton & Fujiki, 1984; Fey, 1986; Girolametto, 1988; Girolametto, et al., 1999; Keenan & Schieffelin, 1976; J. E. Roberts, Price, & Malkin, 2007; J. E. Roberts, et al., 1989; Tannock, 1988; Yoder, Davies, et al., 1994). Reliabilities were established at several stages during the adaptation of these two coding systems and high inter-rater agreements were obtained, indicating high reliability of the codes in the coding systems.

Three main conversational outcomes measures were derived for the subsequent studies from the conversational topic turn coding system: topic change (TC), topic extension (TE), and topic maintaining responses (TM). TC is an act whose *lack of contingency* to the preceding act means it is not related to the preceding act; TE is an act that is contingent but shades the focus of attention of the act to a different but related focus of attention; and TM is a contingent act that continues the conversational topic introduced by a TC or TE. The facilitative technique coding system consisted of four techniques: imitation, expansion, follow-in questions, and follow-in cloze procedures. Imitation is an immediate repetition of the child's preceding complete or partial verbal act without adding any linguistic unit; expansion is an immediate repetition of the child's preceding word, word approximation, vocalisation, or completion of the child's preceding utterance by the addition of one or more morphemes or semantic information; follow-in questions are wh-questions that maintain or extend the topic of the preceding act; and a follow-in cloze procedure is an incomplete utterance with a significant pause in the end so that the child can supply the needed information. Following this, four studies involving different research methodologies were conducted to address the three questions raised. Three of these four studies (Studies 1, 3 and 4) used child participants with conversational difficulties from a range of diagnosis, as children's conversational behaviours may overlap across aetiological diagnoses and children with the same diagnostic category may present with considerable variation in their conversational behaviours (e.g., Adams, et al., 2002; J. E. Roberts, Price, et al., 2007). The studies conducted for this thesis are summarised in the following section.

7.2 Summary of the research studies conducted

7.2.1 Study 1: Changes in caregiver-child conversational skills following a caregiver group training intervention programme

The first study, described in Chapter 3, employed a single subject design using four caregiver-child dyads. Three children diagnosed with Down syndrome and one born prematurely and with low birth weight, and their caregivers were recruited. The children attended a multidisciplinary intervention programme at the Champion Centre while their caregiver attended a parent-implemented language intervention programme, It Takes Two to Talk (ITTT; Manolson, 1992; Pepper & Weitzman, 2004). The dyad's TC, TE and TM, and

the caregivers' facilitative techniques were measured before, during, and after the ITTT programme. As hypothesised, the findings of this study suggest that the ITTT programme help caregivers to improve their conversational contingency through increased rates of contingent conversational topic turns (i.e., TE and TM), decreased rates of non-contingent topic turns (i.e., TC), and increased rates of facilitative techniques (i.e., imitation, expansion and follow-in cloze procedure). Concurrently, their children also showed improvement in conversational contingency through increased rates of TE and TM. The changes shown by the children suggest an interactive effect with the changes shown by their caregivers. Finally, this study showed that caregivers who exhibited a wider range of improvement in their conversational topic turns and facilitative techniques had children who also exhibited more improvements in their conversational topic turns.

7.2.2 Study 2: Changes in caregiver-child conversations following an individual caregiver training intervention programme

Study 2 (described in Chapter 4), employed a case series design on three caregiver-child dyads. The children were given a provisional diagnosis of autism spectrum disorders (ASD) and attended the Relating and Communicating (RC) intervention programme at the Champion Centre. Studies 1 and 2 involved two overlapping but distinct caregiver training programmes. They overlap in that they train caregivers to use naturalistic conversational strategies in caregiver-child conversations to mediate children's language development, and they were conducted in partnership with the caregivers, in the context of family-focused intervention (Bailey, et al., 1986), by a multidisciplinary team. However, RC differed from the ITTT in that it was specifically designed to address the core deficits of ASD such as joint attention and social-emotional regulation (Greenspan & Wieder, 1997; Mundy & Thorp, 2008; Schertz & Odom, 2004; Wetherby, 2008; Yoder & McDuffie, 2008) and provided individual one-on-one training to the caregivers as they interacted with their children in real time. RC focuses on providing early joint attention and social-emotional experiences through activities that facilitate the regulation of the child's motor and sensory system (The Champion Centre, 2005; Tatterson, et al., 2011) while ITTT focuses on providing knowledge to caregivers on children's language development and teaching caregivers to follow the child's lead using strategies such as waiting, listening and using facilitative techniques (Pepper, et al., 2004).

In Study 2, the dyad's TCs, TEs and TMs, and the caregivers' facilitative techniques were measured in three phases: initial assessment, intervention and follow-up. Consistent with the literature and findings of Study 1, one caregiver of this study improved conversational contingency through increased rates of contingent conversational topic turns (i.e., TM) and decreased rates of non-contingent topic turns (i.e., TC); and all of them improved their facilitation style through increased rates of imitation, expansion and follow-in questions. Concomitantly, the children whose caregivers showed positive changes, improved their conversational contingency through decreased rates of TCs, and increased rates of TMs. The consistent improvement in these children supports an argument made in Study 1: that they were potentially facilitated by the positive changes in the caregivers' use of conversational topic turns and facilitative techniques. Finally, as documented in Study 1, individual variability in the changes made by the caregivers was found, so this study also suggests that the children's range of improvement might be facilitated by their caregivers' range of improvement as well as by factors inherent in the children.

7.2.3 Study 3: Qualitative changes in conversational topic turns of two children with conversational difficulties

Study 3 (described in Chapter 5) involved a qualitative analysis of the conversational skills of two of the children in Studies 1 (ITTT) and 2 (RC), one from each study. It investigated how these children, whose differences included the aetiology of their conversational difficulties, language capabilities and types of intervention programme attended, changed the use of their conversational topic turns across time to: (i) collaborate on an activity; (ii) expand an activity; and (iii) return to a previously engaged activity or propose a new activity. The findings of this study suggest that the children learnt to collaborate and expand the activity that they engaged in through repeated facilitation from their caregivers' contingent conversational topic turns and facilitative techniques. However, they tended to return to a previous activity or propose a new activity when there was a demand for them to switch their focus of attention. In addition, the findings of Study 3 suggest that the improvement in the children's language capabilities helped them to increase topic contingency as they collaborated on and expanded an activity, as well as before changing an activity.

7.2.4 Study 4: The effects of expansions, questions and cloze procedures on children's conversational skills.

Study 4 (described in Chapter 6) was an experimental comparison of the effects of expansion alone (EA), as produced in most typical caregiver-child conversations, with the effects of expansion in two contrived conditions: expansion combined with follow-in questions (EQ) and expansion combined with follow-in cloze procedures (EC). Study 4 employed a repeated measures design and examined the impact of the different techniques on the conversations of eight preschool children with conversation difficulties and language delay as they interacted with their SLTs. Outcome measures of this study were the children's conversational topic turns in response to the facilitative techniques used. The findings of this study showed that EA is more effective than EQ and EC in eliciting TEs, elicited more non-verbal TMs and fewer non-relevant responses (NRs). It is proposed that this is because EA allows more latitude for the children to respond as TEs whereas EQ and EC constrain children's responses by requiring an answer or limit them to the completion of a very specific expression. In addition, EA also elicited more non-verbal TMs and fewer NRs.

7.3 The impact of caregiver training intervention programmes on caregivers' conversational topic turns and use of facilitative techniques

The ITTT and RC programmes train caregivers to improve their interactional skills with their children. Despite differences in programme structure and child characteristics, findings of Studies 1 (ITTT) and 2 (RC) revealed (i) more consistent improvements in the caregivers' facilitative techniques than conversational topic turns and (ii) consistent increases in the caregivers' use of imitations and expansions. The improvements in the use of facilitative techniques, regardless of group training versus one-on-one training were consistent with findings of past studies (Dale, et al., 1996; Hancock, et al., 2002; Ingersoll, 2011; McDade & McCarten, 1998; M. Y. Roberts & Kaiser, 2011). As both programmes aim to improve caregivers' "interactional skills", the manner in which training is delivered may not be a requirement for the interactional strategies to be effectively learnt by the caregivers (Pickstone, Goldbart, Marshall, Rees, & Roulstone, 2009). By teaching the caregivers strategies to "follow the child's lead", the caregivers might have learnt to share their children's focus of attention better than before intervention started. This could account for the

decrease in their rates of TCs and increase in imitations and expansions following intervention. The lack of consistent changes in the caregivers' conversational topic turns in both programmes indicate that the use of TEs and TMs should be highlighted in caregiver training programmes, given the potential benefits of these topic turns in scaffolding children's topic contingency in conversations.

Naturally, some variations in caregiver outcomes are expected as the type of intervention programme and the population group varied. Although it is not the intent of this thesis to compare intervention programmes, by examining the variation in outcomes, additional information about the impact of intervention is yielded. Data analysis revealed variation in the use of follow-in directives by the caregivers of Study 1 (ITTT) and Study 2 (RC). Caregivers of Study 1 (ITTT) did not show significant changes in their use of follow-in questions in comparison with their baseline rates. Instead, they showed significant increases in their use of follow-in cloze procedures even though this technique is not overtly taught in ITTT. On the other hand, caregivers of Study 2 (RC) used the least number of follow-in cloze procedures among all four techniques throughout their conversations with their children. In the conversational data obtained, the caregivers' cloze procedures typically consisted of a description of the context and followed by a pause (e.g., "The clown is going to..."). Pragmatically, this structure could represent both the "commenting" and "requesting for information" intentions. On the other hand, a wh-question might be perceived as representing "requesting for information only (e.g., "Where is the clown going?"). Because the ITTT programme encourages caregivers to talk about the child's focus of attention and to prompt with simple questions (including those without the wh-form) that suit their children's language level, it could be that the caregivers improved their rates of cloze procedures because cloze procedures allowed them to simultaneously comment and prompt, even though this technique was not explicitly taught in the ITTT programme. On the contrary, as the RC programme does not specifically teach the types and hierarchical use of facilitation techniques, the caregivers from this programme might be less aware of their use of cloze procedures and might have continued to use wh-questions as prompts as their children respond to them.

Individually, the findings of Study 1 (ITTT) and Study 2 (RC) showed that some caregivers showed more positive changes in the use of certain conversational topic turns and facilitative techniques more than other techniques. These differences may be attributed to factors such as the children's responsiveness to these topic turns and techniques (Mahoney &

NevilleSmith, 1996; Pennington & McConachie, 1999; Tannock, 1988), caregiver preferences (Huttenlocher, et al., 2007) as well as other caregiver factors such as personality, social-economic status, knowledge of their children's difficulties (Bornstein, et al., 2007; Drake, et al., 2007; P. Dunham & Dunham, 1992; Howard, et al., 2011; Huttenlocher, et al., 2007; Pancsofar, et al., 2008). The combination of these factors may contribute to variations in the changes shown by the caregivers following their participation in the intervention programme that they attended. While the training structure of ITTT and RC had impacted the caregivers' conversational topic turns and facilitative techniques, positive changes were also noticed in the children's conversational topic turns. The impact of these programmes on the children's conversational topic turns is discussed in the following section.

7.4 The impact of caregiver training intervention programmes on children's conversational topic turns

Studies 1 (ITTT) and 2 (RC) revealed that despite variability in the caregivers' conversational topic turns and use of facilitative techniques, and the children's aetiological diagnoses, all of the children showed rather consistent and similar improvements in their conversational topic turns. While the children of Study 1 (ITTT) exhibited improved conversational responsiveness and topic contingency through higher rates of TEs and TMs, the children of Study 2 (RC) demonstrated improvement through higher rates of TMs and lower rates of TCs. These findings are consistent with the expectation that caregivers' improvement in topic contingency and facilitative techniques mediate children's topic contingency (Brady, et al., 2009; Curcio & Paccia, 1987; Girolametto, 1988; Girolametto, et al., 2007). The findings of Studies 1 (ITTT) and 2 (RC) also revealed individual differences in the change in rates of conversational topic turns among the child participants. For example, Children E and F's changes in conversational contingency were indicated by improvement in their rates of TCs and TMs; and Children A and B's changes in conversational contingency were indicated by improvement in their rates of TE and TM. In addition, there was high variability within each child's rates of conversational topic turns across time points. While variability in child responsiveness can be attributed to child factors such as developmental capability, age, gender and sociability (Bornstein, et al., 2007), the findings of these studies suggest that the changes in the children's responsivity across time is also a combination effect

of the interactions among the changes shown by the caregivers, and other caregiver and child factors (Bornstein, et al., 2007; Howard, et al., 2011). Therefore, in order to obtain similar interventional outcomes, careful selection of the elements of intervention programmes is important. For example, children with ASD have been reported to present with higher levels of anxiety than their developmentally-matched and chronologically age-matched peers, when they encounter difficulties with individual processing of the world (Evans, Canavera, Kleinpeter, Maccubbin, & Taga, 2005). So caregivers might need specific support in these areas, in addition to training in improving their conversational skills. When the elements of an intervention programme is sensitive to caregivers factors and children's responsivity, the programme has high potentials in enhancing the quality of caregiver-child interactions (Ayoub, Vallotton, & Mastergeorge, 2011).

The impact of caregiver's conversational styles on the quality of children's conversational topic turns was investigated in Study 3 (Chapter 5). The findings of Study 3 provide evidence that as children improve their topic contingency, they improve their ability to collaborate and expand play activities and routines. This indicates that activities are essential in the context of scaffolding because they provide contextual cues for children to form conversational topic turns. While these contextual cues can cause variability in children's conversational outcomes (Hoff, 2010; Klein, et al., 2010; Ryckebusch & Marcos, 2004), it is possible that in the development of topic contingency, the familiarity of these contextual cues assist children to increase consistency in TEs and TMs. The children's frequent encounter of similar contextual cues and practising of similar steps, and the caregivers' scaffolding help the children to practise integration of information from their past experiences with the current conversational context (K. Nelson, 1986). The children's constant exposure to their caregivers' use of specific turn structures eventually guides them to improve contingency in their conversations. As the two intervention programmes used in Studies 1 (ITTT) and 2 (RC) teach caregivers to utilise routines and familiar play activities in scaffolding of children's conversational skills, the children also exhibited improved relevance and flexibility in their actions in routines and play activities.

7.5 Facilitative techniques and children's conversational skills

As shown in Studies 1 (ITTT) and 2 (RC), while improvement in caregivers' rates of facilitative techniques appears effective in helping children to increase their rates of contingent topic turns, a more detailed examination of the use of specific facilitative techniques is warranted. Therefore, the third question of this thesis is "What is the impact of facilitative techniques on children's conversational skills?" The findings on facilitative techniques in Studies 1, 2, 3 and 4 are discussed.

In these studies, two types of facilitative techniques were measured: (i) follow-in comments (i.e., imitation and expansion), and (ii) follow-in directives (i.e., follow-in questions and follow-in cloze procedures). Follow-in comments and follow-in directives consist of semantically related linguistic information that map the child's behaviour or focus of attention but they differ in that the former do not carry any social obligation for the child to respond while the latter carry an obligation that the child must do, say or attend to something (McCarthren, et al., 1995; McDuffie & Yoder, 2010). While the facilitative effects of these techniques on children's language skills have been widely discussed (e.g., Bellon-Harn, et al., 2004; Bradshaw, et al., 1998; Fewell & Deutscher, 2004; Girolametto, et al., 1999; Hoff-Ginsberg, 1990; McDuffie & Yoder, 2010; Ruston & Schwanenflugel, 2010; Scherer & Olswang, 1984; Yoder, Davies, et al., 1994) there is a lack of information on the effects of these techniques on children's conversational contingency. As it is claimed that the facilitative features of these techniques help the child to process information beyond the range of his or her current linguistic competence or zone of proximal development (ZPD; Vygotsky, 1978) so that they can analyse their caregivers' input with the least cognitive processing efforts (Gogate & Hollich, 2010; K. E. Nelson, 1989; Sperber & Wilson, 1995), it is suggested that at the conversational level, imitation carries the role of a TM; and expansion, follow-in questions and follow-in cloze procedure carry the roles of both TE and TM. Therefore, as children process the linguistic content of these techniques, it is possible that they also process the conversational function (i.e., TC, TE or TM) of these techniques. Because of this, caregivers' frequent use of these techniques may be perceived by the children as modelling of contingent topic turns. In addition, follow in questions and follow-in cloze procedures may assist in framing the child's subsequent response into a topic turn that is contingent with the current conversational topic.

While Study 1 (ITTT; Chapter 3), Study 2 (RC; Chapter 4) and Study 3 (Chapter 5) examined the changes in the caregivers' facilitative techniques in naturalistic settings, Study 4 (Chapter 6) examined the use of these techniques by SLTs in a contrived environment. Findings of Studies 1 and 2 revealed a similar trend of increased rates in the use of these techniques in both groups of caregivers, as well as the presence of group and individual variations, regardless of the type of intervention programmes that the caregivers attended. However, in Study 4 (Chapter 6), the children's conversational partners were the SLTs who deliberately facilitated the children's verbal acts with these predetermined facilitative techniques: expansion only (EA); expansion combined with follow-in questions (EQ); or expansion combined with follow-in cloze procedures (EC). The findings of Study 4 suggest that the immediate effect of expansion might be obscured when it is followed immediately by a follow-in directive. Study 4 (Chapter 6) showed that EA, a technique that is common in naturalistic CDS elicited more TEs. Study 3 (Chapter 5) consolidated this by revealing that techniques used in naturalistic settings not only have an immediate effect, but a delayed effect on children's use of contingent topic turns too. Through repeated scaffolding of a particular activity, the children were able to spontaneously reproduce conversational topic turns modelled by their caregivers. Even though caregivers' use of facilitative techniques can be enhanced through sufficient training in intervention programmes, the findings of Studies 1 and 2 suggest that impact of intervention on caregivers' conversational skills varies according to the structure of the intervention programme, their children's responsiveness and the nature of the strategies taught. Therefore, when targeting a specific conversational skill in intervention, careful selection and use of facilitative techniques in CDS may result in significant improvement of that particular skill.

7.6 Clinical implications

The findings of this thesis provide evidence that intervention programmes that teach caregivers to follow their child's lead whether by group training or one-on-one training, help caregivers to accomplish higher rates of contingency in their conversations, which then facilitate the children's development of conversational contingency. The benefits of this improved conversational contingency in caregiver-child interactions may mediate the

development of better interactional caregiver-child relationships and the development of children's language skills.

First of all, the development of conversational contingency between caregivers and their children has the potential of improving the relationships between caregivers and children with conversational difficulties (Bailey, et al., 1986). Therefore, it is essential that the SLT evaluate the child's developmental profile as well as the caregivers' concerns and the needs of the child's families, so that intervention programmes that meet the needs of the child and fit the characteristics of the child's families can be recommended (Bailey, et al., 1986; Crais, Roy, & Free, 2006). This will promote effective generalisation of the skills that the caregivers learnt from the intervention programme. As most intervention programmes usually incorporate a range of facilitation skills for the caregivers, it is important that monitoring of progress in caregiver-child dyads includes individual variations so that specific feedback on the caregiver's strengths and weaknesses can be delivered to the caregivers during the course of intervention.

As the development of the caregiver-child relationship through conversational contingency is transactional in nature (Bornstein, 2009; Sameroff, 2009), an effective way to produce more generalisation effect in conversational contingency is through conversational strategies that closely match the naturalistic interaction paradigm (Camarata, 2000). As shown by the findings of Study 4, the addition of follow-in directives as promptings may constrain children's use of TE. Although high use of prompting has been shown to be useful for children with poor intentional communication (Yoder, et al., 2001; Yoder & Warren, 1999), a switch to a more naturalistic approach with less direct prompting, once intentional communication is achieved, may promote more advanced conversational and other aspects of language development. This was supported by Camarata (2000) who further elaborated that intervention should start with procedures that share as many pragmatic features as possible to the generalisation context, and prompting support should be added only when the child shows compromised ability to learn with such procedures.

Because the use of conversational topic turns is inevitable in conversations, it is important that intervention programmes highlight caregivers' awareness of their use of conversational topic turns such as teaching them to use TMs and TEs to follow their child's lead. Therefore, caregivers provide opportunities for their children to experience contingency in a situation or idea as they build linkages among topics. In addition, the use of contingent

topic turns may also help children to build a capacity for sustained attention and learning of language. The acquisition of these skills may account for (i) the positive associations between contingent topic turns and the development of several aspects of language such as development of vocabulary (Akhtar, et al., 1996; Akhtar, et al., 1991; P. Dunham & Dunham, 1996; Rollins, 2003; Ruston & Schwanenflugel, 2010; Trautman & Rollins, 2006), semantic and syntactical skills (Tamis-LeMonda, et al., 2001) and literacy skills (Fewell & Deutscher, 2004; Reese, et al., 2010); (ii) the positive associations between follow-in comments and children's development of vocabulary (Girolametto, et al., 1999; McDuffie & Yoder, 2010), semantics and syntactic skills (Farrar, 1990; Girolametto, et al., 1999; Hoff-Ginsberg, 1990; Loeb & Armstrong, 2001; Scherer & Olswang, 1984; Yoder, et al., 1997) and speech intelligibility (Yoder, et al., 1997); and (iii) the positive associations between follow-in directives and children's development of vocabulary, semantics and morpho-syntax (Bellon-Harn, et al., 2004; Blewitt, et al., 2009; Bradshaw, et al., 1998; Hoff-Ginsberg, 1986, 1990; Yoder & Davies, 1990; Yoder, Davies, et al., 1994).

Finally, three studies of this thesis (Studies 1, 3 and 4) demonstrated similarities in conversational difficulties across aetiological diagnoses can be addressed by focussing on the core of conversational development, such as improving the child's joint attention through contingent topic turns and facilitative techniques in caregiver-child interactions. For example, these facilitative strategies can be used with children with Down syndrome and those with ASD, who have been reported to have difficulties in producing adequate contingent topic turns in conversations (Hale & Tager-Flusberg, 2005; J. E. Roberts, Martin, et al., 2007), delay in joint attentional development (Abbeduto, et al., 2007; Schertz & Odom, 2004; Shumway & Wetherby, 2009) and working memory deficits (Belleville, et al., 2006; Jarrold, et al., 2006). The similarities in underlying impairments may explain why the children across diagnoses responded similarly to their caregivers' change in conversational contingency and the caregivers or adults' use of facilitative techniques. However, as mentioned in Chapter 6, this argument is made with caution because the extent of these skills as foundations for the development of children's conversational skills and the extent of impairment of these precursors in different clinical populations have not been fully established. It is thus important, both theoretically and clinically, to identify which types of pragmatic scaffolding are effective across diagnostic categories.

7.7 Theoretical implications

Theoretically, the findings of this thesis support two theoretical arguments. First, within Relevance Theory (RT; Sperber & Wilson, 1995), the findings of this thesis support that conversational topic turns that are contingent (i.e., TE and TM) and facilitative techniques are "optimally relevant", therefore require lower cognitive processing load on the part of the listener. This is suggested by the increase in the children's rate and quality of contingent topic turns, and by the decrease in the children's non-contingent topic turns (TC) following their caregivers' increased rates of contingent topic turns and facilitative techniques. This adds to the application of RT in the child language literature. Although the principles of RT have been used in several investigations pertaining to children's language development including lexical development (Ewa, 2011), syntactic development (Schelletter & Leinonen, 2003) and understanding of questions (Ryder & Leinonen, 2003), they have not been explored through contingent topic turns and facilitative techniques. The principle of relevance is also in line with other arguments, which state that topic turns that share the child's focus of attention reduce the cognitive demands to switch to a new focus of attention, therefore help the child to notice and process contrasting new information as well as familiar information, more effectively (McCarthren, et al., 1995; K. E. Nelson, 1989; Tomasello, 1988; Tomasello, Carpenter, Call, Behne, & Moll, 2005).

The findings of this thesis also support the social-interactionist theory and transactional model, which claim that caregivers' conversational input interacts dynamically with their children's conversational responsiveness (Bohannon & Bonvillian, 2009; Sameroff, 2009). In Studies 1 (ITTT) and 2 (RC), despite the differences in the combination of conversational improvements shown by their caregivers, the children exhibited similar increases in their rates of contingent topic turns. This consolidates the notion that the child's maturing neural system needs to interact with environmental factors (Baldwin & Meyer, 2008; Bohannon & Bonvillian, 2009), in which case, appropriate stimulation from the caregiver, in order for the child to exhibit effective improvement. The social-interactionist theory and transactional model also claim that the child's continuous advancement provides feedback to the caregivers to consistently fine-tune the quality of their language input (Bohannon & Bonvillian, 2009; Sameroff, 2009) so that so that their language input is within their children's ZPD (Vygotsky, 1978). Based on the findings of the Studies 1, 2 and 3, it is argued that the children's positive changes act as feedback to stimulate their caregivers to

maintain the consistency in conversational contingency. Therefore, in describing the development of children's conversational skills, the roles of the caregivers and their children should be clearly delineated and be given equal emphasis. As both roles advance mutually, an interruption in one role may affect the advancement of the other role.

7.8 Limitations and directions for future research

The research designs of the studies in this thesis influence the findings and the interpretation of the findings. Study 1 employed the single subject design that aimed to provide clinical outcomes by differentiating outcomes that participants respond favourably to intervention from those who did not improve. Study 2 employed the case series design that aimed to generate the inductive hypothesis that improvement in caregivers' conversational topic turns and facilitative techniques mediates development of children's conversational skills. Study 3 was a qualitative analysis of the children's conversations from the transcripts. Study 4 is a comparative study among three facilitative techniques. As the findings of this thesis indicate links between caregiver and child outcome measures, it is suggested that correlational investigations between the outcome measures be conducted to consolidate these associations (e.g., correlational strengths between caregivers' TEs and TMs and children's TE). It is also suggested that future studies include as variables other elements that may motivate the caregivers to select certain specific types of contingent topic turns or facilitative techniques over other topic turns taught in the intervention programmes (e.g., caregivers' personality and social-demographic details, the nature of the conversational topic turn or facilitative technique, and the conversational activity).

The findings of this thesis imply that caregivers' contingent conversational topic turns and facilitative techniques are relevant topic turns that can be processed with the least cognitive efforts (Sperber & Wilson, 1995). However, the breadth of this thesis did not allow investigation of the cognitive mechanisms involved in comprehending these topic turns. A suggestion for future research is investigating the relationships among conversational contingency, facilitative techniques, cognitive skills (e.g., joint attention, working memory and short term memory) and frequent scaffolding by establishing a model of these relationships.

Finally, this thesis focused on children's conversational topic turns solely. As widely reported in the literature and shown by the findings of this thesis, conversational development

is associated with children's language development (e.g., Bellon-Harn, et al., 2004; Bradshaw, et al., 1998; Fewell & Deutscher, 2004; Girolametto, et al., 1999; Hoff-Ginsberg, 1990; McDuffie & Yoder, 2010; Ruston & Schwanenflugel, 2010; Scherer & Olswang, 1984; Yoder, Davies, et al., 1994). Therefore, future studies may investigate the associations between the children's conversational topic turns (i.e., TC, TE and TM) and specific aspects of language development such as semantic and narrative skills. This would provide valuable theoretical and clinical information to SLTs in planning and monitoring intervention goals.

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APPENDIX A

SUMMARY OF THE OUTCOME MEASURES OF INTERVENTION PROGRAMMES REVIEWED IN CHAPTER 1

Intervention programme	Design	Length of dyadic joint attention or conversation	Caregiver's conversational turns	Caregiver's use of facilitative techniques	Complexity of caregivers' language	Children's conversational turns	Complexity of children's language	Children's language scores on a standardised test	Children's social-communication skills on a standardised test
<u>It Takes Two to Talk, Hanen Program for parents (ITTT)</u>									
Pennington, Thomson, James, Martin, & McNally (2009)	Pretest-posttest experimental design on caregiver-child dyads of children with cerebral palsy.	NA	●	NA	NA	●	NA	NA	NA
Girolametto, Pearce, & Weitzman (1996)	Randomised clinical trial on caregiver-child dyads of toddlers with expressive language delay.	NA	NA	●	●	NA	●	●	NA
Girolametto, Verbey & Tannock (1994)	Randomised clinical trial on caregiver-child dyads of children with developmental delay.	●	NA	NA	NA	NA	NA	NA	NA
Tannock, Girolametto & Siegel (1992)	Randomised clinical trial on caregiver-child dyads of children with developmental delay.	NA	NA	NA	NA	●	NA	●	NA
McDade & McCarten (1998)	Pretest-posttest controlled experimental design on caregiver-child dyads of children with expressive language delay; caregiver training vs. no treatment.	●	NA	NA	NA	NA	●	●	NA

Intervention programme	Design	Length of dyadic joint attention or conversation	Caregiver's conversational turns	Caregiver's use of facilitative techniques	Complexity of caregivers' language	Children's conversational turns	Complexity of children's language	Children's language scores on a standardised test	Children's social-communication skills on a standardised test
Girolametto (1988)	Randomised clinical trial on caregiver-child dyads of children with developmental delay.	●	●	NA	NA	●	NA	NA	NA
<u>More than Words, Hanen Program for parents</u>									
Girolametto, Sussman, & Weitzman (2007)	Multiple case study of children with ASD from 3 caregiver-child dyads.	●	●	NA	NA	●	NA	●	NA
McConachie, Randle, Hammal & Le Couteur. (2005)	Randomised clinical trial on caregiver-child dyads of children with ASD.	NA	●	●	NA	NA	NA	●	●
<u>Other caregiver-implemented training programmes</u>									
Aldred and colleagues, (2004; 2001)	Randomised clinical trial on caregiver-child dyads of children with autism; caregiver training vs. no treatment (Aldred, et al., 2004).	●	NA	NA	NA	NA	NA	●	●
Niccols & Mohamed (2000)	Pretest-posttest controlled experimental design on caregiver-child dyads of infants with developmental disorders; caregiver training vs. no treatment.	●							

Intervention programme	Design	Length of dyadic joint attention or conversation	Caregiver's conversational turns	Caregiver's use of facilitative techniques	Complexity of caregivers' language	Children's conversational turns	Complexity of children's language	Children's language scores on a standardised test	Children's social-communication skills on a standardised test
Arnold, Lonigan, Whitehurst, Epstein (1994) and Whitehurst et al. (1988)		NA	NA	NA	NA	NA	NA	●	NA
<u>Milieu teaching</u>									
Ingersoll (2011)	Alternating treatment design on responsive interaction, milieu teaching and RE/PMT on two preschoolers with ASD.								
	(i) Responsive interaction	NA	NA	NA		●	NA		NA
	(ii) Milieu teaching	NA	NA	NA	NA	●	NA	●	NA
	(iii) RE/PMT	NA	NA	NA	NA	●	NA	●	NA
Fey et al. (2006)	Randomised clinical trial of RE/PMT on caregiver-child dyads of children with development delay.	NA	NA	●	NA	NA	NA	NA	●
P. Peterson, Carta, & Greenwood (2005)	Single subject multiple baseline across subjects.	NA	●	●	NA	●	NA	NA	●

Intervention programme	Design	Length of dyadic joint attention or conversation	Caregiver's conversational turns	Caregiver's use of facilitative techniques	Complexity of caregivers' language	Children's conversational turns	Complexity of children's language	Children's language scores on a standardised test	Children's social-communication skills on a standardised test
Yoder & Warren (1988, 1999)	Randomised clinical trial on children with developmental delays; PMT vs. modified responsive small group (RSG)	NA	●	NA	NA	NA	NA	NA	NA
Yoder, Warren, Kim, & Gazdag (1994)	Single subject multiple baseline across subjects on PMT; intervention implemented by research staff	NA	NA	●	NA	●	NA	NA	NA
Yoder, Kaiser, Alpert & Fischer. (1993)	Alternating baseline design with three children. Used the modified version of Milieu Language Teaching Method to present object labels to children.	NA	NA	NA	NA	NA	●	NA	NA
<u>Responsive Teaching (RT)</u>									
Kim & Mahoney (2005)	Pretest-posttest experimental control on caregiver-child dyads of children with developmental disorders; RFI vs. no treatment.	NA	NA	NA	NA	NA	NA	NA	●
Mahoney & Perales (2005)	Pretest-posttest experimental design on caregiver-child dyads of children with developmental disorders; RT on children with pervasive developmental disorders (PDD) vs. children with developmental delays (DD).	NA	NA	NA	NA	NA	NA	●	●

Intervention programme	Design	Length of dyadic joint attention or conversation	Caregiver's conversational turns	Caregiver's use of facilitative techniques	Complexity of caregivers' language	Children's conversational turns	Complexity of children's language	Children's language scores on a standardised test	Children's social-communication skills on a standardised test
Mahoney & Perales (2005)	Pretest-posttest experimental design on caregiver-child dyads of children with developmental disorders; RT on children with pervasive developmental disorders (PDD) vs. children with developmental delays (DD).	NA	NA	NA	NA	NA	NA	●	●
Mahoney & Perales (2003)	Pretest-posttest experimental design on caregiver-child dyads of children with developmental disorders; RFI.	NA	NA	NA	NA	NA	NA	NA	●
<u>Other one one one caregiver training programme</u>									
Kashinath, Woods, & Goldstein (2006)	Multiple baseline design on five caregiver-child dyads of children with ASD; caregiver training across various routines.	NA	NA	●	NA	NA	●	NA	NA
Delaney & colleagues (Delaney & Kaiser, 2001; Hancock, et al., 2002)	AB single subject design across 5 children; caregiver-implemented training programme	NA	●	●	●	●	●	●	●
Dale, Crain-Thoreson, Notari-Syverson, & Cole (1996)	Randomised clinical trial on caregiver-child dyads of children; book reading vs. general conversational training programmes.	NA	NA	●	NA	●	●	●	NA

Note. NA=Not applicable to/not measured in the intervention study. These intervention studies may include other outcome measures not listed above

APPENDIX B

THE CHAT TRANSCRIPTION CONVENTIONS AND FORMAT USED FOR THIS THESIS (CHILDES, MacWhinney, 2000)

Symbol	Code	Definition	Example
@G	Gem header	To mark and label each conversational topic.	@G: Alligator *CHI: alligator . *MOT: yeah alligator goes snap [x 2] .
@Bck	Backgrounding information	Explanatory or background material placed before an utterance.	@Bck: their cat is on the paper *MOT: oh she's watching . *CHI: 0 [^ continues to scribble on the paper] . [+ bch]
*	Speaker tier	To indicate the speaker of each line. It is followed by MOT to indicate mother, ADU to indicate adult, and CHI to indicate child.	*CHI: pencil . *MOT: oh, pencil .
%spa	Code tier	To code the speaker tier.	*MOT: what have I got [^ hides an item] ? %spa: $MOT:TM $MOT: WHQ
$	Speaker code	To identify the speaker for the codes in the code tier. If there are more than one codes, the codes can be put in strings with only spaces separating them.	
%tim	Timing tier	To code time.	*MOT: hey, what have I got ? %tim: 0:02:00
@b	Babbling	Low-level early babbling or high-level sound play in older children. These forms have no obvious meaning and are used just to have fun with sounds. Babblings are usually transcribed as xxx.	xxx@b

Symbol	Code	Definition	Example
@c	Child-invented form	Words created by the child, sometimes from other words without obvious derivational morphology. Sometimes their appear to be sound variants of other words or sometimes, obscure. However, the child uses them consistently to represent specific meanings and adults sometimes come to use these forms themselves.	sofitfats@c
@p	Phonological consistent form	Early forms that are phonologically consistent. Usually these forms have some relation to words.	ohdei@p [: all day]
@g	General special form	Used when the sound is consistently used but not a babble, child invented form or a phonological consistent form.	sefaio@g
@l	Letter	To transcribe letters.	*MOT: t@l is for +..? *MOT: concrete@l [= writing].
@o	Onomatopoeia	Animated sounds or attempts to imitate natural sounds such as animal and vehicle sounds.	woofwoof@o
@si	Singing	A word or phrase that is being sung. The words in a phrase are joined by underscores.	*MOT: so you'll gonna get up@si [x 3] .
@sl	Signed language	A word that is signed using a sign language or informal sign.	duck@sl
@sas	Sign and speech	A word said in parallel with sign or informal sign.	duck@sas

Symbol	Code	Definition	Example
Xxx	Unintelligible speech	A word that cannot be heard or understood by the transcriber after listening to it for at least 3 times.	*MOT: xxx [=! whispers] .
Xx	Unintelligible speech	A word or phrase that cannot be heard or understood by the transcriber but somewhat appear meaningful to the listener in the interaction.	*MOT: [^ turns the tap off] turn down xx .
www	Untranscribed material	A material that the transcriber does not want to transcribe because of its unrelatedness to the study.	*MOT: www [= talks with the child's sibling] . [+ bch]
0	Actions without speech	Actions performed by the speaker that is not accompanied by speech.	*MOT: again ? *CHI: 0 [^ gives the counter to MOT] . [+ trn]
[?]	Best guess at a word	To indicate that the previous word or group of words are simply the transcriber's best guess at what was being said and there is some doubt in the transcriber's mind whether this guess is correct. It is often caused by interference from room noise, recorder malfunction, vocal qualities, and so forth.	*MOT: want up [?]
text(text) text	Noncompletion of a word	An incomplete word but with a clear meaning. The missing material is inserted in parentheses. This notation is used only for partial omission of words.	*CHI: (o)k . *CHI: that the mus(tard) .
[x N]	Repetitions or multiple retracing without correction	A word or phrase that has been repeated a certain number or times. A repeated phrase is indicated with angle brackets.	*CHI: down [x 3] [= looking at the bucket] .

Symbol	Code	Definition	Example
[/]	Retracing without correction	Used in those cases when a speaker begins to say something, stops, and then repeats the earlier material without change. The material being retraced is enclosed in angle brackets. When a word or group of words is repeated several times with no fillers, all of the repetitions except for the last are placed into a single retracing.	*MOT: shall we <have a> [/] have a saucer each ?
[//]	Retracing with correction	Used when a speaker starts to say something, stops, repeats the basic phrase, changes the syntax but maintains the same idea. Usually the correction moves closer to the standard form, but sometimes it moves away from it. The material being retraced is enclosed in angle brackets. Retracing with correction can combine with retracing without correction.	*MOT: <it's a> [//] yeah I think it's hot ..
[///]	Retracing with reformulation	Retracing that involves full and complete reformulations of the message without any specific corrections.	*MOT: that [///] will Cissy fit in there ?
&=text	Simple events	A chain of simple events that do not map onto words, and in which the convention of writing from left to right represents the temporal sequence of events.	&=slurp &=mumbles &=vocalises &=claps &=head:yes *MOT: ok, would you like to sit here &=points:mat ?

Symbol	Code	Definition	Example
[^ text]	Complex local events	An open form to simply insert any sort of description of an event on the main line. Occur exactly at the position marked in the text and do not extend over some other events.	*CHI: that [//] that's Pooh_Bear's [^ puts a cup on a saucer for Pooh Bear] .
[=! text]	Paralinguistic material	To mark paralinguistic events, such as “coughing,” “laughing,” or “yelling”.	*MOT: lots of noises [=! whispers] . This means that the mother whispers while saying the word “noises”. If the mother whispers throughout, the transcription would be: *MOT: <lots of noises> [=! whispers] .
[= text]	Explanation	Brief explanations on the text tier to specify the deitic identity of objects and people.	*MOT: shall we take these out [= referring to the counters in the slots] ?
+…	Trailing off	Terminator for an incomplete, but not interrupted utterance. Occurs when speakers shift attention away from what they are saying, sometimes even forgetting what they were going to to say. After this lull, the speaker may continue with another utterance or a new speaker may produce the next utterance.	*MOT: off and +...
+...?	Trailing off a question	Used when the utterance is being trailed off has the shape of a question. These utterances will also be counted as complete utterances.	*MOT: &=gasps want@sas +..?

Symbol	Code	Definition	Example
+/.	Uninvited interruptions	Used for an utterance that is incomplete because one speaker is interrupted by another speaker.	*MOT: ok right Pooh_Bear you can have +/. *CHI: mm xxx. *MOT: +, lettuce .
+,	Self completion	Used at the beginning of a main tier link to mark the completion of an utterance after an interruption.	
++	Other-completion	A variant form of the +, this symbol marks the latching or the completion of another speaker's utterance.	*MOT: ooh thumb's in your +..? *CHI: ++ mou(th) .
+/?	Interruption of a question	Used when the utterance being interrupted is a question.	
+//.	Self interruption	Used when the speaker breaks off an utterance and starts up another.	*MOT: here we go, you put some sugar in for +//. *MOT: does Ralph want sugar ?
+//?	Self-interrupted question	Used when the utterance being self-interrupted is a question.	
+"/.	Quotation on next line	To mark off a material as quoted in contexts like story reading and similar activities. This form of notation is used when the material being quoted is in a complete clause or sentence.	*CHI: and then the little bear said +"/. *CHI: +" please give me all of your honey. *CHI: +" if you do, I'll carry you on my back.
+"	Quoted utterance	Used in conjunction with the +"/. and +". symbols. It is placed at the beginning of an utterance that is being directly quoted.	

Symbol	Code	Definition	Example
["]	Quotation	Single words that are being quoted in noncomplement fashion with the preceding phrase. Marks a metalinguistic reference to a word or phrase. The metalinguistic reference is surrounded by angle brackets, if it is more than a single word.	*CHI: <discover Michael> ["] . *MOT: <discovering Michael> ["] .
[>]	Overlap follows	Indicates that the text enclosed in angle brackets is being said at the same time as the following speaker's bracketed speech. Both speakers are talking at the same time.	*MOT: <here's our spoons> [>] . *CHI: <on the> [<] tea . *CHI: and the <doggy was> [>1] really cute and it <had to go> [>2] into bed .
[<]	Overlap precedes	Indicates that the text enclosed in angle brackets is being said at the same time as the preceding speaker's bracketed speech. Sometimes several overlaps occur in a single sentence. It is then necessary to use numbers to identify these overlaps.	*MOT: <why don't you> [<1] ? *MOT: <maybe we could> [<2] .
[: text]	Replacement	Substitutes a nonstandard form such as assimilations, phonological variation or dialectal variation with a standard form.	dohdoh [: bird] gonna [: going to]
[+ trn]	Included utterance	To indicate nonverbal acts that are communicative.	*MOT: oh Ralph, give Ralph some water . *CHI: 0 [^ CHI pours water for Ralph] ssh@o . [+ trn]
[+ bch]	Excluded utterances	To indicate nonverbal acts that are noncommunicative.	*MOT: hold handle . *CHI: 0 [= filling water in the bucket] . [+ bch] *MOT: hold the handle .

Note. Adapted from "Part 1: The CHAT Transcription Format" by B. MacWhinney, 2010, *The CHILDES Project: Tools for analyzing talk-electronic edition.*

APPENDIX C

EXAMPLE OF AN EXCERPT FROM A CAREGIVER-CHILD CONVERSATION TRANSCRIPT

```
1     @Begin
2     @Languages:     en
      3     @Participants: CHI Linda Child, MOT Amy Mother, INV
      TzePeng Investigator
4     @ID: en/tzepeng/CHI/2;10.7/female/Hanen//Child//
5     @ID: en/tzepeng/MOT///Hanen//Mother//
6     @Birth of CHI:  13-DEC-2006
7     @Coder:    Tze_Peng
8     @Date:     21-OCT-2009
9     @G:  drawing parts of a person
10    *MOT:      body [= labelling CHI's drawing] .
11    %spa:      $MOT:TC
12    %tim:      0:02:00
13    *MOT:      le(g) [= labelling CHI's drawing] +..?
14    %spa:      $MOT:CIN
15    *MOT:      ey(e) +..?
16    %spa:      $MOT:CIN
17    *CHI:      ++ eyes [= drawing dots] .
18    %spa:      $CHI:RES:MIN
19    *MOT:      eyes .
20    %spa:      $MOT:TM $MOT:IMI
21    *CHI:      hair [= drawing] .
22    %spa:      $CHI:TM
23    *MOT:      hair .
24    %spa:      $MOT:TM $MOT:IMI
25    *CHI:      gegs@p [: legs] .
26    %spa:      $CHI:TM
```

APPENDIX D

SUMMARY OF CODES ESTABLISHED FOR THE CONVERSATIONAL AND FACILITATIVE CODING SYSTEMS

Code	Definition
(I) CONVERSATION	
Communicative act	An act that is directed to the conversational partner, whether or not that partner responded.
Non-communicative act	An act not directed at the conversational partner and included momentary self-talk or a momentary distraction from the topic at hand caused by something going on in the environment.
Verbal act	An utterance made up of words, word approximations, vocalisations and onomatopoeia sounds. Verbal act or utterance boundaries are based primarily on intonation contour and secondarily, on pause duration of 1 second or more.
Non-verbal act	An act that contribution to the interaction is either (i) a sign, conventional gesture (e.g., pointing, showing, nodding, smiling), responsive eye-gaze at the speaker (including confused gazing), eye-gaze to the speaker's focus of attention, or crying or pushing to indicate protest or (ii) is an indicator of a nonresponse (e.g., appearing disengaged from the interaction, manipulating an item on his or her own).
Uncodable	An utterance that is indeterminable because of unintelligibility.
Topic	General "centre of attention" or "question of the immediate concern" of the conversational exchange. Identified by the focus of attention of the act.
Conversational topic turn	A string of acts (i) produced by the same speaker when the speaker takes the conversational floor is grouped, and (ii) that share the same conversational topic.
Type of conversational act	
Topic Change (TC)	An act whose lack of relevance or contingency to the preceding act or topic results in a topic that is not contingent with the preceding utterance or topic. It is an act that (i) has not been introduced in the conversation before the act that introduces it, or (ii) extends the preceding act tangentially. *+ communicative, - contingent, ± verbal*

Code	Definition
Topic extension (TE)	An act that semantically matches some aspects of the preceding verbal act or topic utterance, adds new semantic details to the preceding topic and shifts the preceding central concern relevantly to another related topic. *+ communicative, + contingent, + verbal*
Topic maintaining responses (TM)	An act that maintains a topic initiation or extension by matching the partner's preceding but does not change the general focus of the preceding act. *+ communicative, + contingent, ± verbal*
Non-relevant response (NR)	Coded when a period of 1 second or more during which a topic turn might have occurred but did not.
(II) FACILITATIVE TECHNIQUE	
Imitation (IMI)	Immediate complete or partial repetition of the partner's preceding utterance without adding any words.
Expansion (EXP)	Immediate repetition of the child's preceding word, word approximation, vocalisation, or completion of the child's preceding utterance by the addition one or more morphemes or semantic information.
Follow-in questions (WHQ)	Wh-questions that are related and/or extends the topic of the preceding topic turn.
Follow-in cloze procedure (CPR)	An utterance that contains appropriate junctures or pause at the end so that the listener can supply the needed information.

Note. + indicates that the code contains the feature; - indicates that the code does not contain the feature; ± indicates that the code can be marked as either containing or not containing the feature.

APPENDIX E

DESCRIPTION OF THE RELATING AND COMMUNICATING PROGRAMME (ADAPTED FROM BEYOND THE DIFFERENCE, THE CHAMPION CENTRE, 2005).

Objective		Aim
Structure		
(i)	Multidisciplinary team	To provide a network of support to addresses the range of needs that child and the child's family present with, so that the family can effectively support intervention for the child. The team comprises an SLT, an occupational therapist, a developmental psychologist, a music therapist/specialist and an educational support worker. They are present in the sessions and, have weekly meetings to review each intervention session and plan for the next session. The team also conducts regular meetings with the caregivers and families of the children to plan intervention goals and to discuss the caregivers' concerns in the beginning of each intervention block, and reviews each intervention block at the end of the intervention.
(ii)	Low stimulus fixture	To provide an optimally calm setting so that the child can attend to intervention at an acceptable level of arousal. External distractions are reduced by having only minimal stimulus fixtures (e.g., dimmer lights, enclosed room), and keeping only items required for the current activity in the room (e.g., bringing in only items for blowing bubbles and leaving items of other activities out of the intervention room). Items are quickly changed during transition of activities to maintain a flow of continuation for the child. Puppets and soft toys are sometimes used to help the child to provide distance between the child's emotional experience and the activities, and to help the child to becoming more forthcoming when interacting with the therapists.
(iii)	Providing routines in the sessions	To provide modelling of repeated and familiar routines for the child and the child's caregiver(s). Activities in the previous session were repeated in the next sessions. Small variations are introduced to the activities once the child is familiar with them. Each session also starts with a singing activity and ends with an activity involving musical instruments.

Objective		Aim
Focus		
(i)	Joint attention in caregiver-child interactions	To encourage the caregiver to share the child's focus of attention and to follow the child's lead when providing language input to the child, in the activities conducted by the therapists. Concurrently, the SLT would suggest appropriate language facilitation techniques to the caregiver such as waiting, making follow-in comments, etc as the caregiver interacts with the child.
(ii)	Building the child's social-emotional skills	To improve the child's awareness of and understanding of emotions. This is done by implementing intervention activities in front of a mirror most of the time (unless the mirror is distracting for the child) so that the child can look at his or her face and at the expressions of the caregiver and the therapists. As the caregiver takes part in the an activity with the child, the caregiver is encouraged to increase "moments of meeting" with the child e.g., looking and smiling at the child as the child swings towards the caregiver in a swinging activity.
(iii)	Turn-taking	To encourage the child to spontaneously take turns and to coordinate turns when interacting with others in the activities conducted in the session.
Activity		
(i)	Singing	To help the child and the caregiver(s) to warm up and to tune-in to the session.
(ii)	Proprioceptive and sensory integration	To increase the child's awareness of the child's disposition of body in space and to encourage sensory integration. Examples of activities include massaging the child's body and limbs as the lies on the floor or a gym ball, gentle swinging in different types of swings, peek-a-boo, blowing bubbles, playing with shaving cream or passing the ball. The therapists usually conduct more than one of these activities in the session.
(iii)	Gross and fine motor	To improve the child's development, and coordination of gross and fine motor skills through activities such as bouncing on the trampoline, going down the slide, walking on steps, walking on a horizontal beam.
(iv)	Music	To help the child to engage in physical, linguistic, emotional and cognitive aspects of an interaction through singing and musical instruments.

APPENDIX F

SAMPLE OF THE FORM USED TO ESTABLISH TREATMENT FIDELITY FOR THE RELATING & COMMUNICATING PROGRAMME

Session: CC-18 -130510

Rating of treatment fidelity

(1) Structure			Comments
Transdisciplinary team	Team member: at least two team members in the beginning of the session.	✓	
Low stimulus fixture	• Dimmer lights. • Enclosed room. • Keeping only items required for the current activity in the room. • Items are quickly changed during transition of activities to maintain a flow of continuation for the child. • Puppets and soft toys are used sometimes.	✓ ✓ ✓ ✓ ✓	
Providing routines in the sessions	• Each session starts with a singing activity. • Activities in the previous session(s) are repeated in the next sessions. • Small variations are introduced to the activities once the child is familiar with them.	✓ ✓ ✓	
(2) Focus			
Joint attention in caregiver-child interactions	• Caregiver is included in the activities. • SLT suggests appropriate language facilitation techniques to the caregiver such as waiting, making follow-in comments, etc as the caregiver interacts with the child.	✓ ✓	
Building the child's social-emotional skills	Implementing intervention activities in front of a mirror most of the time (unless the mirror is distracting for the child) so that the child can look at his or her face and at the expressions of the caregiver and the therapists. As the caregiver takes part in the an activity with the child, the caregiver is encouraged to increase "moments of meeting" with the child e.g. looking and smiling at the child as the child swings towards the caregiver in a swinging activity.	✓	
Turn-taking	Child is encouraged to take turns in the activities.	✓	
(3) Type of activity			
Singing		✓	

Proprioceptive and sensory integration	Examples of activities: Massaging the child's body and limbs as the lies on the floor or a gym ball, gentle swinging in different types of swings, peek-a-boo, blowing bubbles, playing with shaving cream or passing the ball.	✓	✓
Gross and fine motor	Examples of activities: bouncing on the trampoline, going down the slide, walking on steps, walking on a horizontal beam.	X	
Music	-	√	
Total		9 /10	

APPENDIX G

PERCENTAGE OF CONVERSATIONAL TOPIC TURNS PRODUCED BY EACH CHILD FOLLOWING EACH FACILITATIVE TECHNIQUE

Child	1	2	3	4	5	6	7	8
Diagnosis	DS	DS	DS	DS	9p TMS	ASD	ASD	DS
Outcome measures								
EA → TE	29.41	6.12	22.00	19.23	12.5	26.92	18.18	17.31
EQ → TE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EC → TE	5.56	5.00	23.08	0.00	0.00	0.00	12.5	0.00
EA → Verbal TM	44.12	71.43	56.00	50.00	41.67	23.08	72.73	48.08
EQ → Verbal TM	46.15	66.67	50.00	54.55	22.22	42.86	71.43	44.44
EC → Verbal TM	66.67	50.00	53.85	50.00	40.00	92.31	68.75	22.22
EA → Non-verbal TM	20.59	10.2	8.00	19.23	20.83	23.08	0.00	7.69
EQ → Non-verbal TM	15.38	11.11	0.00	9.09	11.11	42.86	0.00	11.11
EC → Non-verbal TM	16.67	0.00	7.69	0.00	0.00	0.00	0.00	0.00
EA → NR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EQ → NR	30.77	22.22	16.67	36.36	66.67	0.00	14.29	44.44
EC → NR	11.11	40.00	7.69	50.00	60.00	0.00	25.00	77.78

Note. DS=Down syndrome; 9pTMS=Unbalanced translocation and monosomy 9p syndrome; ASD=Autistic spectrum disorder; TE=Topic extension; TM= Topic maintaining responses; NR=Non-relevant responses; EA=Expansion alone; EQ=Expansion combined with wh-question; EC=Expansion; → =the type of conversational topic turn elicited by the facilitative technique e.g., EA → TE = topic extension elicited by expansion alone.